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Taking Advantage of the Business Situation

Readjustment in Metalwork Industries Should Follow the Trend of Events—Diversified Products and Sales Outlets—New Lines for Old

BY STERLING H. BUNNELL*

IT is generally admitted that the most acute period of the business depression throughout the United States has passed. As after other depressions of which we have record, improvement will surely come, slowly at first, then with increasing speed. Little can be done consciously by any one to affect general conditions; but it is possible by taking thought to move in the direction of the general current of affairs instead of trying to fight a way against it.

Certain general principles control all business. After a depression, prices are relatively low, and rise slowly. Profits must therefore be less, and may disappear entirely unless costs can be reduced. Wages fall more slowly than prices, but the desire of the workman to hold his job causes him to do a better day's work, so that the margin above labor cost may be increased. The indication is clearly that now is the time to help workers to a better understanding of conditions, so as to reduce labor cost, and to introduce new methods for the same purpose. Output as a whole may have to be reduced until greater purchasing power is developed, or a greater sales effort realized. General increases of plant are therefore not to be expected; but better production machinery may be absolutely necessary in order to keep down costs and hold trade. The purchase of such machinery can sometimes be financed by the aid of its manufacturers, who need the business and can better afford to take it on long time than turn it down.

But the special problems of individual concerns are the ones most difficult to handle. A factory may have been built up to supply to another a single special line of goods and has operated steadily and at a profit for years. The reason for the continued existence of the arrangement is that the special line of goods requires special knowledge of raw materials and processes, which knowledge the purchasing factory does not want to add to its other responsibilities. Suddenly all delivery orders are cancelled by the single purchaser, and the other factory without sales organization or knowledge of market possibilities is put out of business indefinitely, probably with a large stock on hand of raw material bought at previous high prices.

MR. BUNNELL undertook an investigation for THE IRON AGE *with a view to telling our readers what has been done in the metal-working industries and what must yet be done, in the light of what has happened in business in the past* 18 *months. Many plants were visited and representative manufacturers were interviewed. The results will be presented in a series of five articles, of which the first appears this week.*

The titles of the remaining four are as follows:

2. Putting Idle Equipment to Use.

3. Progress in Readjusting Manufacturing and Sales Costs.

4. Progress in Conversion of War Factories.

5. Broadening the Sales Field.

It has been the aim to make these articles practically suggestive and we believe they will prove highly valuable to every manufacturer in the metal-working field.

The 1920 Crisis in the Automobile Field

This particular situation occurred in most factories supplying goods to automobile manufacturing plants. Ruthless cancellation of orders for all sorts of supplies and components called attention to the fact that orders from automobile builders were not orders at all. In many cases, even "releases" directing shipment of goods made up and held in readiness were repudiated, the goods were refused on receipt at buyers' plants, and payment denied to the shipper. No trade has ever arrogated to itself the right to commit such acts, on such a huge scale, as did the builders of automobiles when they found themselves unable to sell the cars they had already completed.

The general feeling of indignation on the part of manufacturers whose orders were thus canceled is natural enough, but hardly justifiable in view of the circumstances which ought to have been in plain view to every business man sufficiently well informed of general principles to hold a position of responsibility.

Problems of the Industry

Automobiles generally have been subject to annual redesign, so that last year's style is as unsalable as last year's style in clothing. The builder completes his design a year ahead, and places his contracts for parts and supplies some months in advance of the first sales of the coming season, as is absolutely necessary in order to give the parts manufacturer time to produce dies and fixtures, obtain material, and start produc-

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tion. The automobile manufacturer must sell most of his year's output within three or four months. In any other machinery manufacturing business, it would be necessary for the concern to possess enough working capital to pay the entire cost of production in advance of sale and collection. But the automobile manufacturer would require an enormous working capital for this purpose, and would have use for it only three or four months of the year. The requirements, therefore, have been met generally by inducing the manufacturer of parts and supplies to carry them in stock at his own expense, and compelling the selling agent to pay cash in advance of shipment of automobile ordered, or at least to lend his credit n the form of notes or trade acceptances.

The magnitude and generally profitable character of the manufacture of automobile components induced people generally to accept business under these obviously hazardous conditions, and so to "hold the bag" for the automobile man. The fear of loss of trade caused manufacturers to accept orders to a value which they could have easily ascertained to be greater than the entire invested capital of the purchasing automobile builder. In view of these conditions, the parts manufacturer made himself a virtual partner with the actual maker of the motor car. He knew that his receipts would depend on the ability of the automobile maker to sell his output, and that failure to do so would make the parts accounts uncollectible. To cancel orders and to accept cancellations under such circumstances was the only possible course.

Avoid Dependence on a Single Line

In readjusting to avoid in future the disastrous effect of such a slump in one particular field of business, the obvious thing to do is to develop other lines of production. A manufacturer ought to sell in more than one market. For instance, making both a necessity and a luxury provides an outlet for bad times and another for good times. One of the greatest American financial and manufacturing groups has so diversified its lines by acquiring industries that there seems to be no intelligent plan in control. The fact is, however, that the broadest of plans has long been in operation—to make some of everything their own plants use, and sell some of the product of every plant to purchasers outside the group. Therefore, a depression in the sales of one or more factories does not have the effect of shutting down others, since the latter are only in part dependent on the former to absorb their output.

The Development of New Lines

At present there is an acute temporary need to develop new lines of production. The easy profits of good times are past—or some distance ahead in the future—and standard manufactures must be produced for a time on a very close margin. In contrast, novelties often can be started without the handicap of past losses, and attract attention even when purchasers of staples are refusing to buy. The time to bring out something new is just before business improves, so that when free purchasing begins again, the preliminary period of introduction will be past and sales will increase rapidly.

As to the character of the new lines which might be available to metal-working plants, the range is wide. The little "put-and-take" top recently used many tons of brass rod and much screw-machine capacity, but the business could not last long. Few owners of small automobiles are in position to buy new ones when times are bad, but many of them refit the old cars with repair parts and attachments. This creates an outlet for suitable articles to tide over the period of depression. Idle equipment may suggest the manufacture of some product requiring its use, like the making of tile and terra cotta in a brick yard. Some one starts to advertise a new device, and immediately there comes up the possibility that manufacturing equipment is not yet provided sufficient to take care of the sales. An existing shop with the proper tools may be able to take up the production at a profit, and carry on until general improvement makes it desirable for the owners of the new device to provide their own factory and the temporary makers to return to their regular line. In some such way an active mind working on the problem of finding work for idle men and machines may be able to get business, perhaps with some novel article which fills a want unrecognized before.

The suddenly developed interest in the wireless telephone has put work into shops which never before produced electrical devices. If it proves to be only a passing fad, it at least will have helped to keep workers employed through a slack period. If it continues to absorb a large amount of productive effort, new and larger works eventually will take over the manufacture, as the temporary sources of supply return to their regular lines.

Seeking Points of Greatest Saving

A manufacturer of machinery used in a certain industry has recently written to a number of representative plants, asking them to tell him their greatest needs or opportunities for the saving of labor or reduction of waste. He intends to take up one or more of the suggestions he will receive in this way and develop new machinery to do the desired work. Thus he will make use of his designing force, and in all probability will add to his line of production one or more entirely new machines which will be without competition, and have a wide field of sale.

Making machines or products to sell direct to the ultimate consumer has the advantage of a market always open. Some things, like food, are always bought in nearly the same quantities regardless of the times. Others, like clothing, may not be bought as readily during short seasons of depression, but in the long run must average about the same from year to year. Such articles as enter into new construction for manufacturing purposes are not bought except when capital for investment is available, which is generally not the case in bad times. There is a great advantage, therefore, if a steady output is to be maintained, in producing something that sells direct to the multitude.

Household labor-saving devices have accordingly become a profitable part of the output of many shops formerly doing very different work. The vacuum cleaner and laundry washing machine were already well established when the business depression began, and since that time inventors everywhere have been working on machines for dish-washing, refrigerating and other household services, and finding plenty of manufacturers ready to make and sell. In this way new industries have come into existence, which will later require new factories and tool equipment and so provide future work for the machine tool shops.

Readjustment is the order of the day. Every item of work done in one shop provides an outlet for the product of another, and enables the workmen to buy goods produced in still other places. Cost of production must be reduced, so that each worker may turn out in a day a larger quantity of salable goods, bringing to all concerned a greater value of the time consumed. Labor cost has already come down and will fall still further. Materials may or may not be further reduced. Overhead has probably been much reduced, but must be cut to the very limit to eliminate non-producers as far as possible. Already a general increase in inquiries is noticeable, as well as some increase in orders actually booked.

Many manufacturers have shown their enterprise

and courage by developing new lines of production and new methods of sale. In a following article, we shall describe and illustrate some of the ideas which have been evolved by men impatient of waiting for good conditions to be fully restored and already taking an active part in creating demand. By making purchasers they assist in starting money once more into circulation and cause business to wake up.

SYNTHETIC AND ELECTRIC IRON*

Steel and Iron Ore As Raw Materials in Steel and Open Top or Shaft Furnaces

THE manufacture, in the electric furnace, of low phosphorus pig iron from scrap steel turnings is commonly known as synthetic pig iron. It is the purpose of this paper to consider the manufacture of synthetic pig iron and pig iron produced electrically from ore, under present day conditions, as well as the possible use of the electric furnace in the foundry, in the manufacture of iron suitable for gray iron castings.

Synthetic Pig Iron from Steel Scrap

Synthetic pig iron may appear to many to have been born during the late war, to have flourished while the war lasted, and to have died with the war. Little if any such iron is produced to-day on the American continent, and similar conditions may be said to exist in Europe. It would be a mistake, however, to assert that the last has been heard of synthetic iron, as the present stoppage in its manufacture is not due to its production being commercially impossible, but rather to the fact that plants engaged in such manufacture during the war, which were specially built to take care of that industry, have been closed down for lack of demand for the product, and also by lack of the necessary raw material.

The writer does not consider however, that synthetic iron will again be produced to any extent in such plants, but rather looks to a more general adoption of the process in foundries where electric furnaces are already installed or could be installed, and where gray iron as well as steel castings are produced, the same furnace serving for both classes of metal. Quite a number of iron foundries, where the electric furnace is in use, have been producing gray iron castings from cast iron borings, and with remarkable success, the iron being of a high standard both in regard to strength and machining qualities. So long as these borings can be obtained at attractive low prices it would not be necessary to look for other raw material.

Unfortunately the demand for cast iron borings is in excess of the supply, mainly due to the large tonnage used in blast furnaces. This source of supply will eventually fail, prices now being paid for such borings, with further advances in prospect, will not permit of their economical use in the electric furnace. However, as iron, suitable for the gray iron foundry, can be obtained at about the same cost by the use of steel turnings, as in the case of cast iron borings, synthetic iron may again come back and become a permanent part of the industry.

Open Top and Shaft Furnaces

Both open top smelting type furnaces and steel furnaces have been used in the manufacture of synthetic iron. The open top type is easier to operate, and permits a higher carbon to be obtained in the finished iron, than with the steel furnace. Refining, however, has not the same possibilities in this type as with the steel furnace. The steel furnace is also more adaptable to the foundry and although carbon over 3.2 per cent is hard to obtain, it has been demonstrated that high carbon is not the only essential in the quality of an iron for foundry work. Excellent castings have been made with iron containing not over 3 per cent in carbon, the further refining of the metal apparently making up for the lower carbon content.

It is the opinion of the writer, that further study in the manufacture of synthetic iron in the electric steel furnace, especially regarding better methods of carburizing the iron, might result in means being found of producing iron with carbon content similar to what is obtained in the blast furnace. This combined with further refining would make the electric furnace without a rival, where quality metal is essential.

Pig Iron from Ore by Electricity

No further advance in the art of producing pig iron from ore, in the electric furnace, has been made if the truth must be told, since the experiments conducted by the Canadian Government at Sault Ste. Marie, Ont., in the winter of 1905-6. It is true that shaft and open type furnaces of considerable size have been built and are still operating in Sweden, but the results, outside of the fact that pig iron is being produced, are so far from economical that there appears to be little or no future for this industry for years to come.

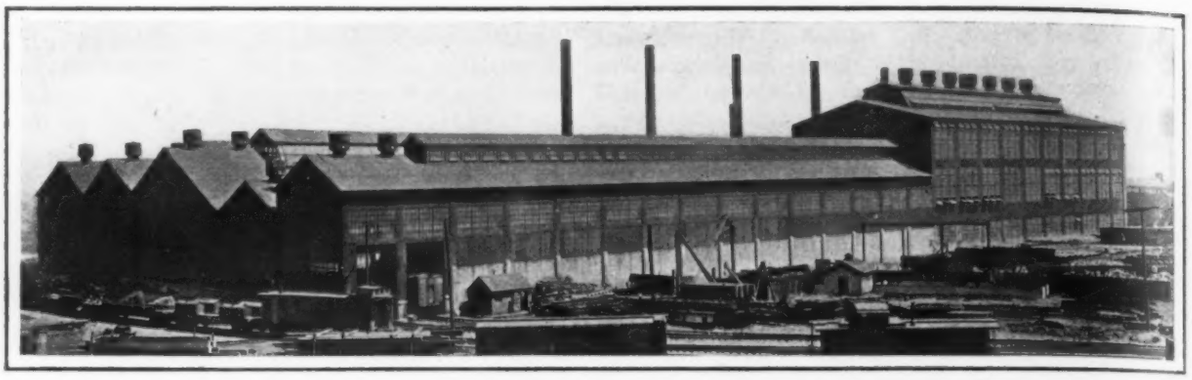
Unless improved methods are discovered, which would result in the power input per ton of finished product being materially reduced, which would further result in a proportional decrease in all other items of cost, with the one exception of raw materials, the outlook for expansion in the production of pig iron electrically from ore, is far from promising. The only way open to countries far removed from the source of pig iron supply, is to resort to synthetic iron, by using their available scrap in an open top furnace. In such a furnace by the addition of a very small quantity of carbon to the charge, a first class grade of iron could be produced, which would cover a fairly large percentage of their requirements. Also by mixing a certain percentage of iron ore with the scrap, if such ore is available, the output in iron could be materially increased.

The smelting of iron ore electrically is a problem that will eventually have to be met, as a day will come when coke will be no longer available, and as it becomes scarcer, an ever increasing cost in this commodity can be expected. With the one exception of Sweden where furnaces are operating, and the experiments by the Canadian Government mentioned above, no serious attempts have been made by Governments or private individuals or corporations, to find improved methods whereby costs of production and power input would be materially reduced. Should such research be undertaken in the future, either by Governments, private individuals or corporations, it is to be hoped that a sane type of furnace will be adopted, and the work be intrusted to men well known in the electrical furnace field. Many of past failures in electric furnace research work may be put down to the work being handled by persons with little knowledge of the practical end of electric furnace work, and to the use of furnaces that were freaks or of impossible design.

*Abstract of a paper, "Synthetic and Electric Pig Iron Sanely Considered," presented at the forty-first general meeting of the American Electrochemical Society, Baltimore, Md., April 27 to 29. The author, Robert Turnbull, is managing director United States Ferro Alloys Corporation, Niagara Falls, N. Y.

Announcement has been made of the National Exposition of Power and Mechanical Engineering to be held at the Grand Central Palace, New York, from Dec. 7 to 13, inclusive (except Sunday intervening). The exposition will immediately follow the annual meeting of the American Society of Mechanical Engineers and it is expected that the exhibits will supplement the programs and discussions at the professional meetings of the society. The professional divisions of the society will hold sessions relating to fuels, stokers, steam power plants, railroads, steam utilization in the paper industry, textile and gas power.

The Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, has placed one furnace of its new steel plant in operation. This includes four 80-ton open-hearth furnaces, a 32-in. blooming mill and a 24-in. sheet bar mill.



An Adaptable Electric Steel Company

Two Forging Plants of Different Characteristics Afford Opportunity for Handling in Each the Work to Which It Is Best Fitted

BY SIDNEY G. KOON*

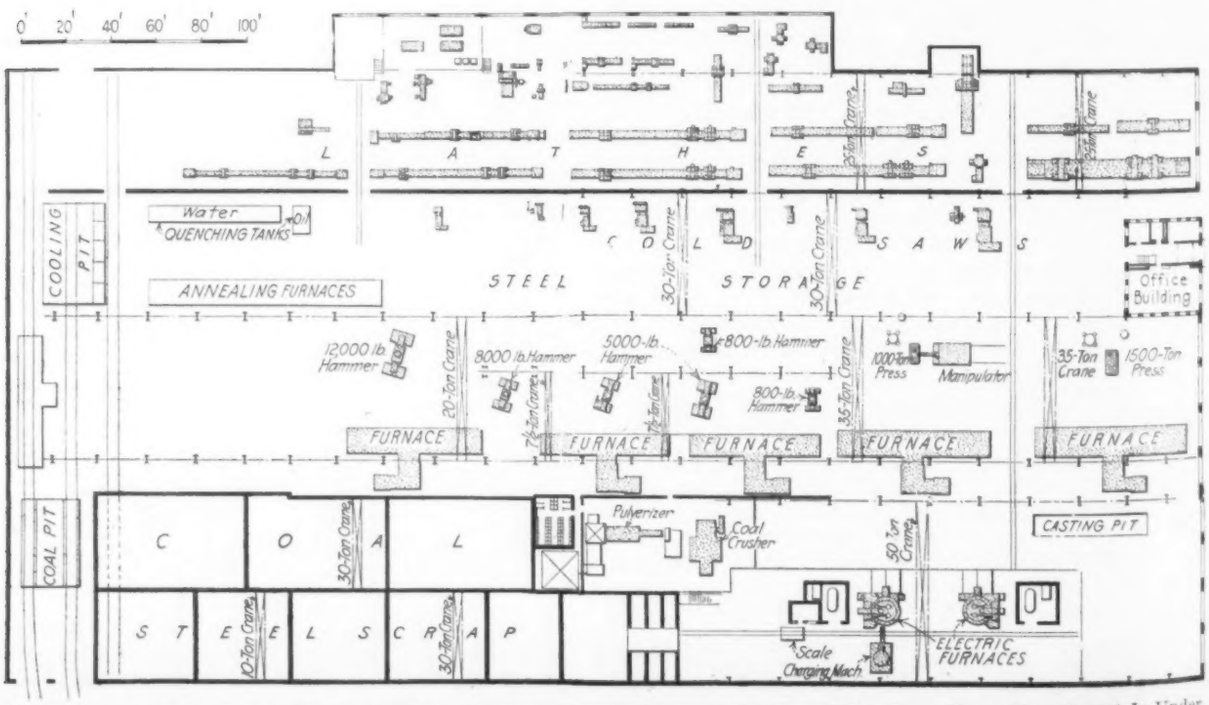
WITH the acquisition of the Hammond Steel Co. at Syracuse, the Sizer Forge Co. of Buffalo has obtained a property which it is expected will fit well into the operating schedules of the larger organization and provide an outlet for certain products which can be made more readily at Syracuse, and which, in some cases, will be made from a by-product of the larger plant. Both plants have electric steel furnaces and the entire output will, in each case, be electric furnace steel, except as open-hearth steel forgings are specified, in which case the billets are purchased. Due however to the fact that one of the furnaces at Syracuse is as small as 3 tons, the company is now far better fitted for handling special orders in small quantities than has been possible when the equipment was confined to 12-ton furnaces.

With a varied output, consisting in the main of heavy forgings, such as crankshafts, connecting rods, die blocks and trimmer steel, stern and rudder frames for ships, chilled steel rolls and large tonnages of tool steel billets and blooms, as well as a considerable line of special products, such as balls, rods and bars, it becomes possible, under the new arrangement, to concentrate on the heavy work at Buffalo and on the smaller work, such as balls and bars, at Syracuse. A further advantage lies in the possession at Syracuse of two rolling mills, the larger being capable of handling billets up to 7 in. square. This makes it possible to roll down into proper sizes bars for Marcy mills and for the making of balls for mine and cement mill use. In those cases, however, where the balls are above 5 in. in diameter, the work will be done at Buffalo, where the equipment permits the making of balls up to 19 in.

*THE IRON AGE, New York.

The Buffalo Plant

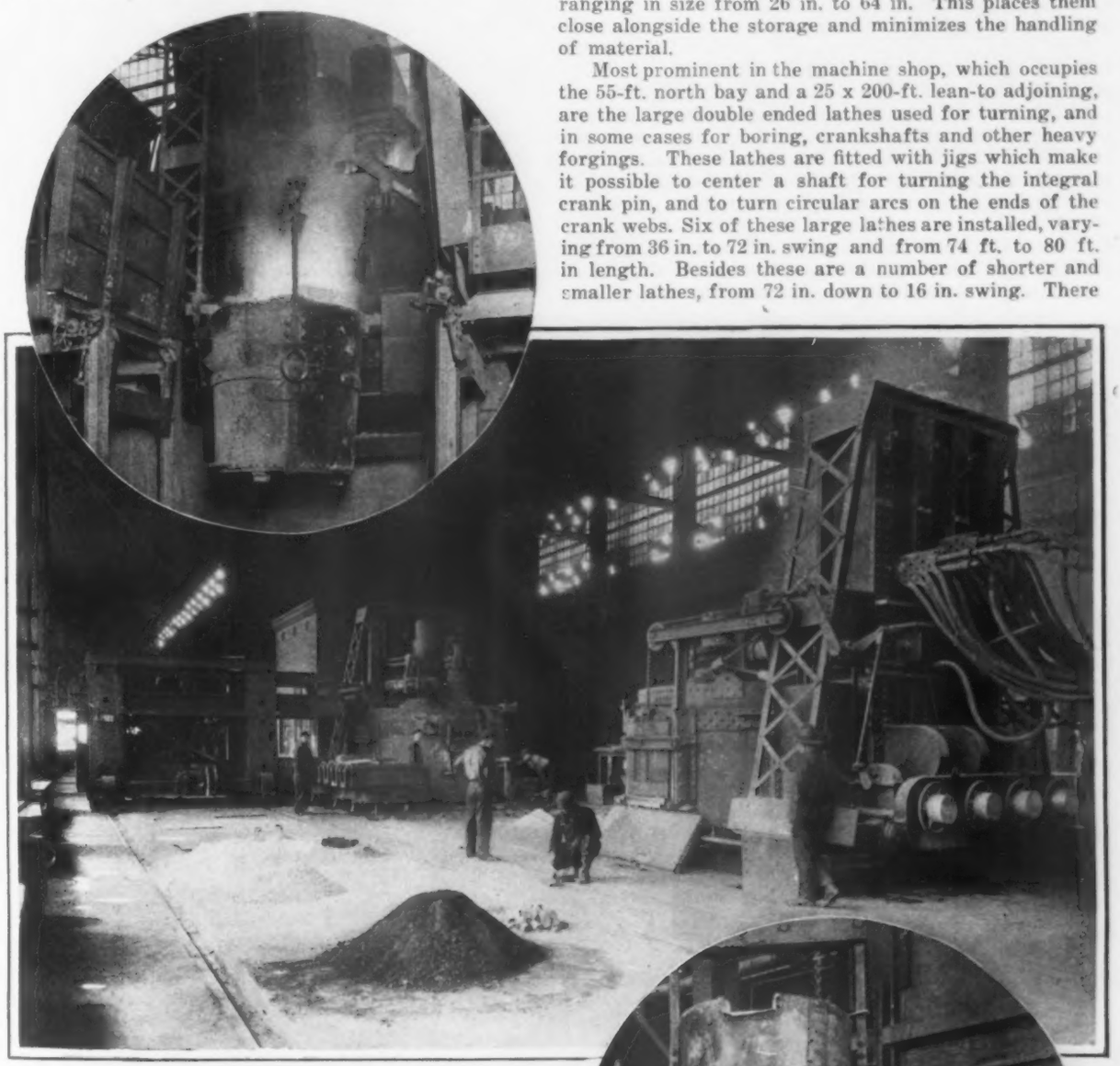
While the company has been operating at Buffalo for more than a generation, the present plant is virtually new, entirely under cover and self-contained. It consists of four long parallel bays, the length being about 535 ft. and the total width about 291 ft. The three



In the Layout of the Buffalo Plant, of Which a General View Is Shown at the Top of This Page, Every Department Is Under Cover, Including Both the Steel Scrap for Melting and the Partially Finished Product Awaiting Machining

southernmost bays are all open from one to another, while the north bay, containing the machine shop, is shut off by a wall to keep dust away from the machining operations.

In the southern bay are the two 12-ton Heroult electric furnaces, which are capable of making four heats



Making Steel in the Buffalo Plant. The upper view shows one of the electric furnaces pouring into the ladle, the floor sections being lifted to admit the ladle. In the center the charging machine is shown at work. Below is shown the use of the hot top on ingots

each per day, melting from cold stock. This bay contains also, at the western end, the scrap storage under a roof and therefore protected from the weather. The coal pits are immediately north of the scrap pits, and the coal pulverizing plant east of the coal pits. The casting pit is in this bay, while the heating furnaces lie against this bay, in the second.

The second bay, 78 ft. wide, is the forge bay. It contains two steam hydraulic presses of 1500 and 1000 tons respectively, and 5 steam hammers varying from 800 to 12,000 lb. There is an adequate quota of Shaw cranes for handling the material from the furnaces to the forges and from the forges to the industrial cars which deposit the forged pieces in the third bay.

At the east end of the third bay is the four-story office building. Mostly this bay, which is 54 ft. wide, is devoted to the intermediate storage of ingots and forged parts, the latter in most cases awaiting transfer to the machine shop. Stock under cover is thus fully protected and oxidation minimized. Near the west end of this bay is a long multiple oil-fired Rockwell annealing oven, 105 ft. in length, with twenty doors and with arrangement for placing intermediate fire brick walls at intervals of a little over 5 ft., so that the oven may be run either in whole or in part, according to the needs of the moment. Adjacent to the annealing furnace are two quenching pits, one containing water and the other oil. Along the north side of the bay is a battery of eight cold saws ranging in size from 26 in. to 64 in. This places them close alongside the storage and minimizes the handling of material.

Most prominent in the machine shop, which occupies the 55-ft. north bay and a 25 x 200-ft. lean-to adjoining, are the large double ended lathes used for turning, and in some cases for boring, crankshafts and other heavy forgings. These lathes are fitted with jigs which make it possible to center a shaft for turning the integral crank pin, and to turn circular arcs on the ends of the crank webs. Six of these large lathes are installed, varying from 36 in. to 72 in. swing and from 74 ft. to 80 ft. in length. Besides these are a number of shorter and smaller lathes, from 72 in. down to 16 in. swing. There are also planers from 32 in. to 72 in. gap, together with slotters, drills, shapers and boring mills. All machine tools are driven by individual adjustable speed direct current motors.

Melting and Forge Equipment

The two electric furnace units are supplied with Niagara current, which comes into the plant at 11,000 volts and is stepped down by transformers to 150 volts, with taps at 10-volt intervals, down to 100 volts. Each furnace has a capacity of 3000 kva. They are located

on a platform 19 ft. above the floor level, which platform carries also the two brick and concrete transformer houses. The furnaces are 28 ft. apart on tilting cradles operated by motors and counterweights and are served by a 50-ton ladle crane.

Square, round and octagonal ingots from these furnaces are made in sizes from 12 to 42 in. in section, fluted, top poured and cast with the large end upward. In many cases a sink-head is cast on top to take up whatever sponginess may remain in the metal. The great care exercised to avoid defects in quality is exemplified by the fact that unless a cooling ingot will readily disengage itself from its mold it is not used except to cut up for small work. The chances that a sticking ingot may have, in its surface, the nucleus of a seam appears to be too great a chance to take, and one which is not acceptable.

The heating furnaces, ten in number, in pairs, are fired with pulverized coal prepared in a 40 x 88-ft. house within the building bay covering the electric furnaces and immediately back of the heating furnaces. Ingots are charged direct into these furnaces from the casting pit; thus conserving both heat and labor, reducing manufacturing costs and decreasing percentage of rejections. Where, for any reason, ingots are stocked before being used, it is customary first to pre-heat them in soaking pits to 1000 deg. Fahr. before charging them into the re-heating furnaces. Coal for the pulverizer comes in at the north end of the south bay, where it is dumped into a pit and thence hoisted by grab buckets into covered bins. Approximately 1500 tons of coal per month are thus handled.

Between each two heating furnaces forming a pair is one 250 hp. vertical water tube waste heat boiler. Half the steam for the entire plant is obtained from this source, the balance of the heat required by the boilers coming from auxiliary heaters. Steam is used for the operation of the steam hammers, for the steam end of the steam hydraulic presses; for heating the offices and machine shop, and for certain auxiliary uses.

Forging of the ingot takes place under one of the two heavy presses. The forge shop, of ample width, extends the full length of the plant. The presses, furnished by the United Engineering & Foundry Co., Pittsburgh, are operated by water pressure provided through a steam intensifier, the steam cylinder having about six times the diameter of the water plunger. Steam is used to raise the upper die. After passing through the presses, blooms which require further work are handled under one or another of the steam hammers. The main work of these hammers, however, is in taking care of smaller pieces. A sixth steam hammer, located north of the row of production hammers, is used by the blacksmith department, where all tools are dressed.

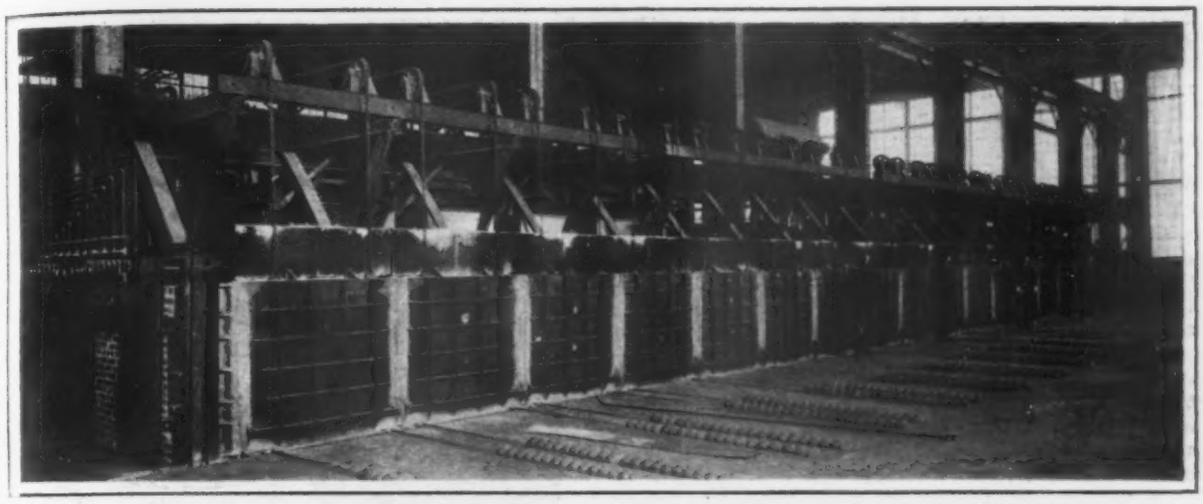
Control of the melting of the steel in the electric furnaces is provided by quick determinations of carbon and other metalloids, in the chemical laboratory, which lies almost under the furnaces. Control of the annealing process is provided by a series of Leeds & Northrup recording pyrometers, located adjacent to the annealing unit.

Charging of the electric furnaces is done by means of a charging machine and charging boxes, similar to those used in open-hearth practice but somewhat smaller. This avoids both the excessive manual labor of hand charging, and the great consumption of time required by that method. Similarly, in many cases, billets or small ingots are handled under the 1000-ton forging press by means of a mechanical manipulator, which grasps one end, subjecting all the rest of the length to treatment under the forge.

Looking West in the Forge Bay; in Foreground Is the 1500-Ton Steam-Hydraulic Press; Behind It Is the 1000-Ton Press, with Hammers Still Farther Back and Heating Furnaces at Left

Inter-communication east and west in the plant is wholly by means of electric overhead traveling cranes. In the north and south direction, however, the transfer of material is wholly on rails, there being six sections of narrow gage industrial track inter-connecting the various departments, and separated by intervals of 80 to 100 ft. from each other. Similarly, the railroad inlet and outlet at the west end of the plant run in a north and south direction, there being two tracks, one of which traverses the width of the first three bays of the building, while the second covers also the machine shop. The latter track has a track scale of 150-ton capacity for control of outgoing shipments.

Equipment at Syracuse includes, as its major unit, one 1000-ton United Engineering & Foundry Co. steam



Car Bottoms Roll into the Annealing Furnace (Top) on the Balls, Which Run in Grooves. At right is the machine shop, with its large double ended lathes, each equipped with two head stocks and two tail stocks and double carriages. Below are shown the steel storage and cut-off saws in the third bay, as viewed from the office building, with the forge bay visible at the left, while the machine shop lies behind the windows at right

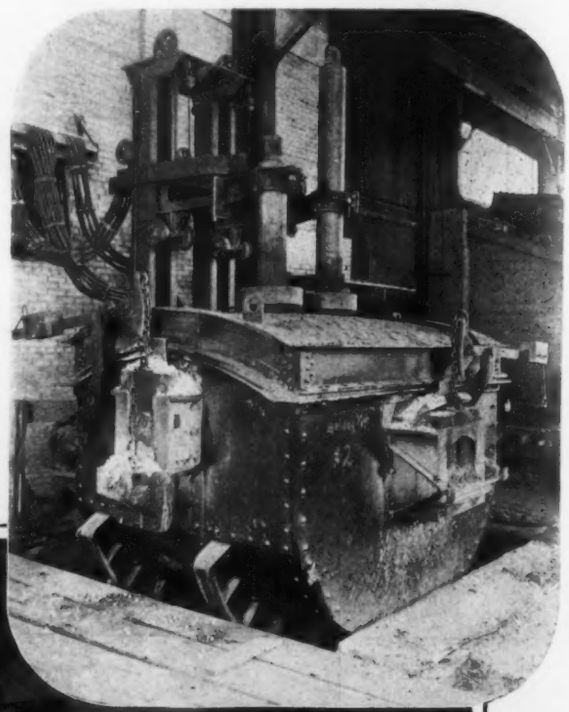
hydraulic forging press. As in Buffalo, the steam comes from waste heat boilers, there being two boilers of 110 hp. located adjacent to four large ingot heating furnaces. This press has a 48-in. opening between dies, and is served by a 10-ton electric crane equipped with electrically operated chain manipulators of 7½-ton capacity.

The eight steam hammers at Syracuse range from 500 to 6000 lb. Each has sufficient furnace heating capacity to permit constant production. The furnaces are served by cranes and by cooling racks and straightening beds. While the machine shop equipment at Syracuse is of far less magnitude than at Buffalo, it has sufficient capacity for plant maintenance and for a small amount of production work.

Annealing is done in six annealing furnaces of the car type, fitted with recording pyrometers, and served by two 2-ton cranes. The heat treating department includes three oil fired car-type furnaces, two of 10-ton and one of 5-ton capacity. The former can take bars up to 14 ft. in length.

A pickling department has been installed to handle all sizes of billets and commercial lengths of bars. There is also a grinding department, through which all ingots and billets pass before going into the forging or rolling departments.

Two rolling mills, one 16 in. and the other 10 in., are installed, the larger of which can take 7 in. billets or ingots. This mill consists of three 3-high and one



At Right Is the 3-Ton Electric Furnace in the Syracuse Plant; There Is Also a 12-Ton Heroult Furnace Here. Below is the 1000-ton steam-hydraulic forging press at Syracuse

2-high stands, manufactured by the Lewis Foundry & Machine Co., and is operated by a 500-hp. General Electric motor. The motor is connected through gearing, reducing the speed from 500 to 85 r.p.m.

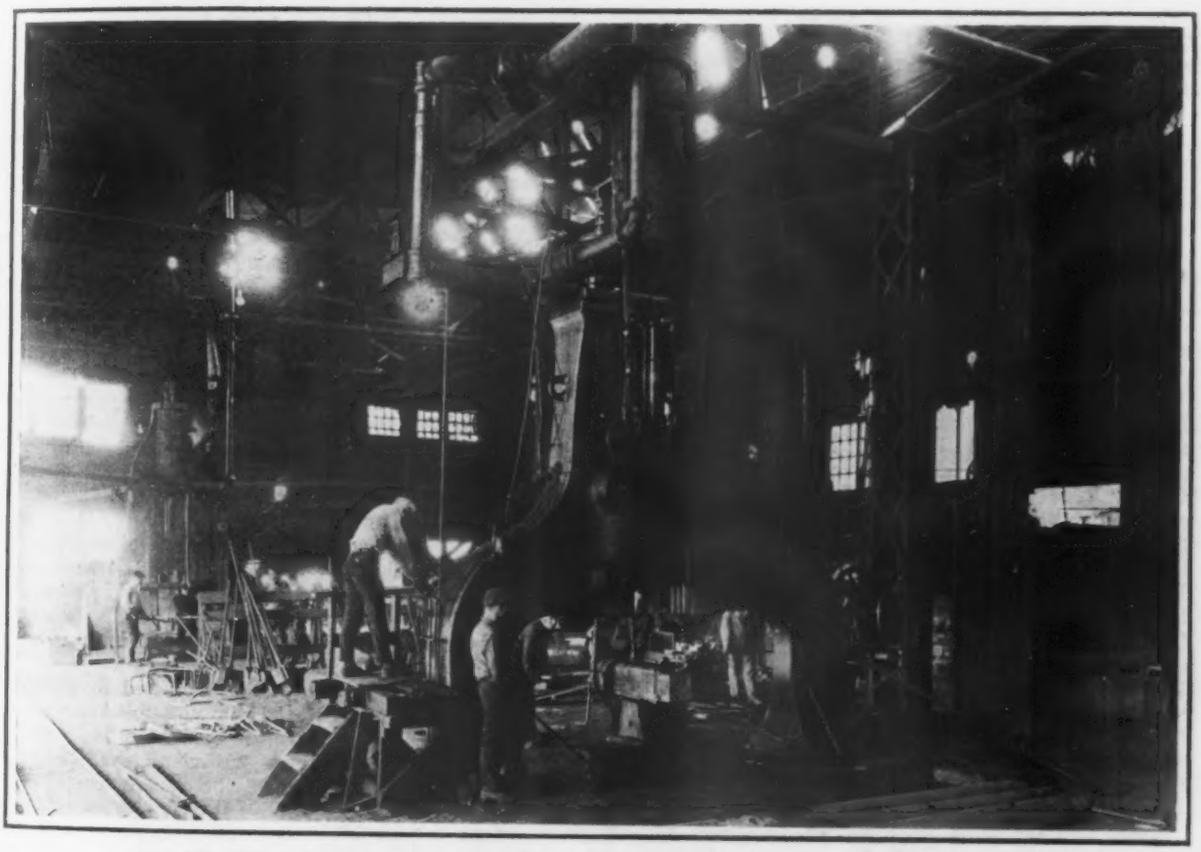
The 10-in. mill has five 3-high roll stands and is operated by a 300-hp. General Electric motor. Between the motor and the mill is a three-speed Falk gear drive, permitting the mill to operate at 110, 220 or 360 r.p.m. This allows for a great range of work and for various qualities of steel.

Special Types of Product

One outstanding feature of the company lies in the fact that there have been developed certain products which can be turned out as a sort of "back log" and on which the orders appear never to "dry up." Among these is a die block of special make which is formed by forging down an ingot into a billet of the correct cross section, and then cutting this into lengths to suit. By this means it is possible to ship die blocks frequently on 24-hr notice, in place of the ten days or more required when custom forging on six sides is demanded.

Another item in the "back log" consists in blooms or billets of tool steel quality, produced in various sizes, under continuous orders, which call for certain definite amounts per month, and which can be worked in in such a way as to avoid the peaks of shop production on other orders. Quantities of this material are used for oil country tools, particularly for bits, under-reamers and cutters, required in drilling oil wells. Billets out of which balls are eventually to be made form another item of flexibility in the production schedule and, at the same time, make it possible to utilize stub ends of ingots, the bulk of which have gone into large shafting orders. By forging these stub ends down into billets 7 in. square and shipping them to Syracuse in carload lots, they may be rolled or forged there, whereas if kept in Buffalo they would, in many cases, be relegated to the scrap heap

In Foreground Is the 10-In. Mill in the Syracuse Plant; at the Rear Is the 16-In. Mill. One of the heating furnaces may be seen at right



One Corner of the Main Hammer Shop in the Syracuse Plant, Showing a Bloom Being Forged

This 16-In. Rolling Mill in the Syracuse Plant Can Take Billets Up to 7 In. Square

and eventually be charged back into the electric furnaces for remelting.

As the price of electricity in Buffalo is fully one-quarter less than the price in Syracuse, it is desirable to concentrate at Buffalo as much as possible of the electric melting.

Management

One impressive feature observed in the management at Buffalo is the comparative youth of the men in charge. The average age of the six leading men is only 43, and this in spite of the fact that the present management has been in control for the last eighteen years. It has been the policy of the company to gather into one organization a group of men who had already made reputations as executives in particular branches of the forging industry. This same tendency has spread into the inspection and other departments.

Under the reorganization, which is taking place this week, the company becomes known as the Sizer Steel Corporation.

PERSONNEL FEDERATION ACTIVE

Publishes Journal of Personnel Research—Will Distribute Reprints of Papers

The Personnel Research Federation, organized a year ago under the auspices of the Engineering Foundation and the National Research Council to coordinate the efforts of the two hundred and fifty scientific, engineering, labor, management and educational bodies which are studying personnel problems in the United States today, reports a year of progress.

The primary objects of the organization, to act as a clearing-house of information and eliminate duplication of effort, were greatly furthered by a survey of existing agencies, made by J. David Thompson, and issued as a bulletin of the U. S. Bureau of Labor Statistics. With this information at hand, Dr. W. V. Bingham of the National Research Council and Alfred D. Flinn, secretary of the Engineering Foundation, called a second conference on March 15, 1921, for the purpose of organizing a permanent body. At this conference the National Research Council, the Engineering Foundation, the American Federation of Labor, Bryn Mawr College, the Bureau of Industrial Research, Carnegie Institute of Technology, the National Committee for Mental Hygiene and the University of Pennsylvania became charter members. Officers appointed were: Robert M. Yerkes, chairman; Samuel Gompers, vice-president; Alfred D. Flinn, secretary; Robert W. Bruere, treasurer. Dr. Beardsley Ruml, who was appointed acting director, was forced to resign owing to pressure of other duties, Leonard Outhwaite taking his place.

The first annual meeting was called in November, 1921, in Washington, and was attended by fifty persons, twenty-five of whom represented membership in the Federation. Two new active memberships were Dartmouth College and the Bureau of Vocational Information. The U. S. Bureau of Labor Statistics, the U. S. Bureau of Mines, the U. S. Civil Service Commission and the U. S. Public Health Service had become co-operating members, as well as Harvard University, Northwestern University and the University of Chicago.

Dr. Robert M. Yerkes, chairman, emphasized the importance of personnel research in improving working conditions and making industry serve human satisfaction. Other papers were given by Dr. C. S. Yoakum of Carnegie Institute, Joseph W. Hayes of the Scott Co. of Philadelphia. Dr. L. L. Thurstone, Dr. L. R. Thompson of the U. S. Public Health Service, Dr. R. R. Sayers of the U. S. Bureau of Mines, and Miss Anna Bezanson of the University of Pennsylvania. Samuel Gompers' paper on "Some Problems of Personnel Research of Interest to Organized Labor," was read by Mathew Woll, vice-president, American Federation of Labor.

Since this meeting, the central office has been attempting to secure funds for a more permanent establishment and for furthering certain specific inquiries. It has arranged for the publication of a monograph series to provide an outlet for papers already given and subsequent researches of importance. The earlier numbers will deal with job analyses and occupational description, in studies aiming to develop a technique of occupational description and a standard terminology.

Another enterprise is the Journal of Personnel Research, the first issue of which will appear in May. In this number there will be an article by President Angell of Yale on "Reasons and Plans for Research Relating to Industrial Personnel." "Development of Personnel Research" by Alfred D. Flinn, and "Basic Experiments in Vocational Guidance" by C. S. Yoakum. Samuel Gompers will contribute an article on "Co-operation of Workers in Study of Industrial Personnel Matters," in an early issue, and others promised are: "Intelligence of Policement" by L. L. Thurstone; "What is Personnel Research?" by Robert M. Yerkes.

Other researches in progress are: Job Analyses of Managers; Interest Analyses, Will-Temperament Traits and Vocational Aptitudes; Selection, Training and Supervision of Salesmen; Women in Chemistry, and other studies in hygiene and safety in a variety of industries.

Bethlehem Steel Optimistic

E. G. Grace, president of the Bethlehem Steel Corporation, said at a recent directors' meeting that production at the corporation's plants is now on approximately a pre-war basis.

"Operations," he said, "are about 80 per cent of theoretical capacity. Practical capacity is not ordinarily more than 90 per cent of theoretical. This rate compares with 40 to 50 per cent in the first quarter of the year and with about 25 per cent at the lowest point of depression."

Regarding earnings and prices, Mr. Grace said that bars, shapes and plates were now on what he termed a "1.60-cent plus basis a pound." He expressed the opinion that a price to yield a reasonable profit to producers would be about 1.75 to 1.80 cents, as compared with 1.50 cents at the low price.

Bethlehem Steel has not been affected by the coal strike. Its mines are worked by non-union labor and there has been no interruption of supplies.

Sales in March were greater than those of January and February combined, and the March rates were maintained in April.

Advance in Steel Castings

The American Steel Foundries announces that, effective May 15, discounts on freight car castings in lots of 1000 pieces and over from one pattern will be discontinued, and on and after that date discounts now obtaining for quantities of 500 to 999 pieces will apply on orders for 500 pieces and over from one pattern. It is explained that prices on this class of work have been much lower than production costs warrant and further increases will undoubtedly prove necessary at a later date. The steel castings industry is peculiar in that it feels the effects of a buying movement much later than the steel mills. Whereas the plates, shapes and bars required for railroad cars are ordered practically simultaneously or shortly after the letting of the cars themselves, the orders for the castings cannot be distributed until the designs have been completed. The preparation of designs for castings ordinarily takes several weeks and sometimes a month or two. As a result, a good share of the castings required on the freight cars ordered in the past two months are still to be placed.

American Electrochemical Society

Discusses Electric Cast Iron at Annual Spring Meeting—Historical Data—Duplexing, Cold Charges and Synthetic Iron

THE feature of the forty-first general meeting of the American Electrochemical Society at Baltimore, April 27 to 29, was a symposium on electric cast iron. History was made in that it was the first comprehensive meeting on this subject ever held. Nine papers were contributed covering electric cast iron as made from cold charges or by duplexing with the cupola; synthetic cast iron, and also electric furnace pig iron from the ore. The attendance was large and the discussion animated and profitable.

The symposium and the meeting were in charge of H. T. Hinckley, National Carbon Co., Niagara Falls, N. Y., and Bradley Stoughton, consulting engineer, New York, the latter presiding over the discussions. An adjourned session in the afternoon of Thursday was necessary to complete the program, an unusual occurence in this society.

Four Phases of Electric Cast Iron

A group of four papers was presented before any discussion was allowed, embracing the historical, economic, metallurgical and "sane" phases of the subject. The first paper "Cast Iron as Produced in the Electric Furnace and Some of Its Problems" by George K. Elliott, chief metallurgist the Lunkenheimer Co., Cincinnati, was presented by the author. An abstract appears elsewhere in this issue.

The papers, "Electric Cast Iron," by W. E. Moore, and "Synthetic Cast Iron" by J. L. Cawthorn, both of the Pittsburgh Electric Furnace Corporation, Pittsburgh, in the absence of the authors, were presented in abstract by Robert Turnbull, United States Ferro Alloys Corporation, Niagara Falls, N. Y., and by F. A. J. Fitz Gerald, the Fitz Gerald Laboratories, Niagara Falls, respectively. Mr. Cawthorn's paper contrasts the basic with the acid furnace for producing cast iron from borings, particularly steel, and discusses the methods of regulating the composition of the resulting iron, with special emphasis on the advantages of the acid bottom.

The fourth paper, "Synthetic and Electric Pig Iron Sanely Considered," was presented by the author, Robert Turnbull. An abstract of this brief paper is found on other pages of this issue.

The general discussion on these papers was opened by Dr. Richard Moldenke, Watchung, N. J., who spoke of the necessity of a high super-heat to reduce the gas content and of his agreement with Mr. Elliott that dynamic tests of cast iron are desirable as differentiating between cupola and electric irons. He emphasized the danger of a high sulphur content and the advantage of a basic electric furnace in mitigating this, alluding to three methods of lowering sulphur. These he outlined as a higher pig iron charge in the cupola, electric refining and—a new process brought out in Germany recently—the introduction of a chemical compound into the ladle after the removal of the slag, possibly a potash compound, which reduces the sulphur content at least one half.

Electric Cast Iron in Germany

Doctor Moldenke then read a translated abstract of an article from a German source which gives the experience of a German foundry where duplexing with the electric furnace is practiced. This was in part as follows:

Works Manager Koella, in conjunction with Dr. H. Nathusius, made their first refining tests in the electric furnace of molten cast iron from the cupola in 1918, and the tests turned out so well that the entire production of gray iron castings at the Vogtlaendische Maschienenfabrik in Plauen is now duplexed, and no cupola iron poured into molds direct.

The usual day's run consists of four charges of five tons each run during an 8-hr. day. Occasionally five charges are put through, in which case, however, the sulphur content of all the heats suffers considerably as the time of refining in the electric furnace is cut correspondingly short. Nothing but scrap is melted in the cupola, 20 per cent of which consists of steel. No additions are made to the metal in the cupola or big crane ladle, and the entire charge is tilted into the electric furnace hearth. Here the necessary lime and fine coke additions are provided and the reactions go on for 40 to 60 min.

The first charge necessarily takes a little longer in spite of the pre-heating of the electric furnace. After testing the metal for temperature with the usual spoon ladle by pouring into an open sand mold and rabbling in the required ferrosilicon and ferromanganese, the entire charge of iron and slag is tapped into the pouring ladle. The slag is removed with particular care for, at the existing temperature, this is very thin and apt to enter the molds with the metal. The composition of the iron before and after duplexing is about as follows:

	Cupola Iron, Per Cent	Electric Furnace Iron, Per Cent
Total carbon	3.25	3.00
Silicon	1.60 to 1.70	2.00 to 2.30
Manganese	0.35	0.55
Phosphorus	0.06	0.06
Sulphur	0.23	0.05

The exceptionally low phosphorus for foundry iron will be surprising to American foundrymen, and is evidently due to the German ore situation. The sulphur, however, is disagreeably familiar. The increase in silicon and manganese comes from the ferroalloy additions. On occasions, when it was impossible to tap promptly to make use of the molten metal, the sulphur content actually went down to 0.01, which shows what can be accomplished if time and added cost need not be considered particularly.

Improvement in the quality of the castings was noticed at once. Pin holes, excessive shrinkage, hard spots and other troubles traceable to cupola oxidation disappeared and the wear and tear on the machine tools has been reduced. The iron made is tough but not hard. The strength of the castings has risen 30 to 40 per cent, and was readily pushed up to 100 per cent when occasion demanded it. The greatest advantage, however, was found in the reduction of the percentage of defective castings made, particularly in automobile cylinders. Naturally, the refractory qualities of sand and cores had to be raised to care for the higher temperatures involved.

A complete table of costs is given by *Giesserei-Zeitung*, which is interesting only in the subdivisions enumerated, as the figures themselves are based upon conditions entirely different from those existing in America. Such items as coke for pre-heating the electric furnace, magnetite and core binders used in the operation are not often given, and the depreciation is set at the rather high figure of 20 per cent, with interest on the investment at 5 per cent. The cost calculations for German conditions, with an allowance of 7 per cent for melting loss in the cupola and 3 per cent in the electric furnace, brings out the molten metal about 30 per cent cheaper than the corresponding grade could be made by melting in the cupola only. This would come from starting with an all-scrap charge as against the usual pig and scrap mixtures.

The current consumption will be of interest. The kilowatts in the eight hours for the charges from No. 1 to No. 5, where five heats were duplexed, ran as follows: 340, 240, 190, 150 and 140. The current consumption with the last two charges became rather constant, and hence it is judged that by continuing operations for a longer period the average current consumption could be cut to 160 to 170 kw.-hr. per ton of molten metal ready to pour.

The advantages of the duplexing method are summed up as follows by the officials at the Plauen plant:

Lower cost of molten metal than obtainable in cupola melting process.

Ability to make better cast iron than is possible in the cupola.

Smaller percentage of defective castings.

Machining costs lower, for tools.

Machine labor costs lower by reason of performing work on less castings turning out defective. Piece-work rates can be lower as castings are not hard.

Better sales opportunities at higher prices for quality work produced.

Ability to use borings and turnings.

Easier regulation of composition and temperature of end result.

Pouring facilities better, particularly in small castings shops. No waiting of gangs of molders at the cupola spout for molten iron.

The production cost of one ton (metric) of cast iron by duplexing in cupola and electric furnace, based upon an average consumption of 220 kw. per ton, and a cost of 0.60 mark per kw.-hr., with scrap at 650 mark per metric ton, is given in the following table. Allowance is made for 7 per cent melting loss in the cupola and 3 per cent in the electric furnace, hence about 1100 kg. to give a ton of molten metal.

	Marks
1100 kg. scrap @ 0.65 m.	715.00
Cupola melting costs	196.00
Current in electric furnace (1.03 × 220 × 0.60)	136.00
Ferromanganese	30.00
Ferrosilicon	32.00
Electrodes	5.00
Coke for pre-heating furnace	8.00
Lime	7.50
Dolomite	1.25
Other fluxes for slag-making	5.25
Magnetite and binders	2.75
Wages for electric furnace operation	19.50
Wages for repair gang and materials	22.00
Miscellaneous operating costs	7.00
Depreciation (20 per cent)	15.00
Interest on investment (5 per cent)	8.00
Total for 1000 kg. (1 metric ton)	1,210.25
Deducting from this total, value of 30 per cent sprues, at scrap rates (300 × 0.65)	195.25
Cost of 700 kg. castings, would cost (metal only)	1,015.00
Or 1 ton of castings (metal only)	1,450.00

German conditions have it that a ton of molten iron in castings, when made by the cupola process only, would cost about 400 to 500 marks more than duplexed metal. (Cupola requires pig and scrap mixtures.)

Mr. Elliott called attention to the long refining period in the electric furnace and brought up the question of the method of synchronizing the heats in this German foundry when four to five 5-ton heats per day are mentioned. Dr. Moldenke replied that it was the practice in some foundries over there to use several cupolas intermittently which perhaps explained this.

The question of casting losses in these two processes, cupola and electric, was brought up by Robert J. Anderson, Bureau of Mines, Pittsburgh, which was answered by Mr. Elliott by the statement that the greater cost of the electric cast iron in the ladle was more than offset by the lowering of the rejections in the foundry before and after machining.

The Question of Costs

Bradley Stoughton directed attention to the impossibility of the correctness of some of the statements of cost in the paper by W. E. Moore, and this was followed by considerable general criticism of the paper, particularly the claim as to quick melting, emphasis being laid by F. W. Brooke, Swindell & Co., Pittsburgh, on the difference between the heat absorption rate of cast iron as compared with steel borings, the former being lower. He also combatted the claim that an acid bottom was the best; this might be true in some cases but it is not the only one to use for gray iron.

Robert Turnbull, in commenting on the Moore paper, claimed that the cost of electric iron would better be stated as $30 per ton rather than $15 and F. Hodson, Electric Furnace Construction Co., Philadelphia, asserted that the Moore furnace, so far as the question of slow types was concerned, was the same as the Ludlum or the Heroult and that the advantage of the basic furnace is that it deoxidizes as well as desulphurizes.

E. L. Crosby, Detroit Electric Furnace Co., Detroit, offered some testimony as to the comparison of the Detroit rocking furnace with the cupola when melting iron. With a cost for borings of $7.50 to $8 per ton and an expense for current of 1.8c. per kwhr. the electric consumption was 500 to 600 kwhr. per ton of cast iron with the electric cost about $23.60 per ton against a cupola cost of $25 per ton. The main consideration, however, is not the cost in the ladle but the marked decrease in rejected castings.

Electric Cast Iron in Alaska

Among the more general papers on electric cast iron, which followed the four papers just considered, was one by W. E. Cahill, metallurgist and foundry superintendent Alaska Treadwell Gold Mining Co., Treadwell, Alaska, entitled "Intermittent and Alternating Operations." This is a brief account of the rather remarkable operations of an Heroult electric furnace making both gray iron or steel castings interchangeably in a region where pig iron and coke are scarce and expensive. In THE IRON AGE, June 16, 1921, a brief description of this work was published and commented on. Mr. Cahill's paper will be given further publicity in a later issue of THE IRON AGE.

In discussing this paper Bradley Stoughton characterized it as economically important as showing how iron and steel castings can be made in many remote places cheaper than by standard methods; that there are many such places as Alaska, particularly in South America, where the use of such furnaces would avoid the necessity of bringing castings by airplane to replace broken ones.

Cast Iron from a Non-Ferrous Furnace

"Melting Cast Iron in the Booth Rotating Electric Furnace" was the subect of a paper by H. M. Williams, research department General Motors Research Corporation, Dayton, Ohio. The author stated that the 250-lb. furnace referred to was not purchased for commercial work but for experimental, but that it finally was used for making iron castings from borings. The various steps involved are briefly discussed and some analyses are given to show the effect of melting on the composition. Castings made from borings, pig and back scrap and all back scrap are refined and then physical tests are given. Mr. Williams stated that he has made synthetic iron from boiler punchings, ferrosilicon, malleable iron from borings and steel and alloy iron of various kinds in this furnace which was adaptable to all types of melting where refining by slagging is not required.

Doctor Moldenke expressed his satisfaction with the manner in which this furnace seemed to handle borings, always difficult to melt. The author gave the power consumption on a ton basis as about 675 kw.-hr. per ton on pig and scrap charges and less than this when borings were used.

Synthetic Cast Iron

The paper, "A Study of Carburization in the Manufacture of Synthetic Cast Iron," was presented in abstract by the author, Clyde E. Williams, metallurgist, Northwest Experiment Station, Bureau of Mines, Seattle, Wash. It is an analysis of the various conditions existing when steel is converted into cast iron synthetically and treats particularly of the relative advantages in the use of different varieties of carbon, of the effect of slag and of impurities. Some of the conclusions are as follows:

The carburizing ability of different forms of carbon decreases as the ash content increases and the denser varieties of carbon are more effective than the more porous ones. Artificial graphite, resistor carbon, petroleum coke, and coal-tar coke give better results than the higher ash cokes or charcoal.

The presence of slag decreases the rate of carburization by tending to prevent contact between the metal and the carburizer. This action is more pronounced as the acidity of the slag increases.

Silicon carbide is an excellent medium for adding both silicon and carbon to iron. It cannot be used for introducing all the carbon because too much silicon would be carried into the metal and also the cost would be too high.

Silicon has no effect upon the rate or the degree of carburization, although it may slightly decrease the content of total carbon in the resultant pig.

Manganese seems to increase both the rate and the degree of carburization, although this increase is small.

An increase in temperature from 1350 to 1450 deg. C. has no noticeable effect upon carburization.

Synthetic Iron from the Cupola

That synthetic pig iron can be produced in a cupola was brought up by Doctor Moldenke. He briefly described a process which he recently saw in Germany by which steel borings are briquetted in a novel manner. They are passed through a heated steel cylinder through which carbon monoxide gas is flowing. When thoroughly heated, they fall into a hopper and then into an apparatus in which they are hammered into a block or

briquette. Iron shot mixed with ferrosilicon and a cement are also used which melt very easily because of reactions between the silicon and iron. When these briquettes are used as a charge in the cupola, together with perhaps an unusually large amount of coke, a good cast iron results.

Robert Turnbull characterized Mr. Williams' paper on carburizing as particularly valuable and emphasized the role of silicon carbide as a carburizer. Mr. Elliott also testified that much of the data in the paper ran parallel to his own experience.

Electric Pig Iron from the Ore

The subject of electric pig iron from ore was introduced by a paper, "A Comparison Between Shaft and Open Top Furnaces in the Manufacture of Pig Iron Electrically from Iron Ore," by R. C. Gosrow, consulting electrometallurgist, Buffalo. The paper was presented by title in the author's absence and resulted in a running discussion on the open top as compared with the shaft type for pig iron and similar operations. The consensus of opinion was that in Sweden the shaft furnace is almost entirely employed in producing steel-making iron and not foundry iron and it was insisted by some that foundry iron in such furnaces could not regularly be made. Most of the speakers favored the open top furnace for all-around results.

The Society's New Honorary Member

A new honorary member was added to the roster of the society at this convention. At the lecture, Thursday evening, by Prof. R. W. Wood, on "Fluorescence" at the civil engineering building of the Johns Hopkins University, the president of the society, Acheson Smith, Acheson Graphite Co., Niagara Falls, N. Y., announced that the board of directors had conferred honorary membership on Dr. Carl Hering, consulting electrical engineer, Philadelphia, an active member of the society. The other two honorary members of the society are Dr. Charles F. Chandler, Columbia University, New York, and Dr. Edgar F. Smith, University of Pennsylvania, Philadelphia. In accepting the honor, Doctor Hering recalled that 21 years ago he was one of three men, the others being C. J. Reed, now of San Francisco, Cal., and Dr. J. C. Roeber, deceased, who met in Philadelphia and organized this society.

New Officers and the Next Meeting

At the annual business meeting of the society Friday morning, the following officers were elected for the ensuing year:

President—Carl G. Schluederberg, assistant to manager supply department, Westinghouse Electric & Mfg. Co., Pittsburgh.

Vice-Presidents—H. C. Parmelee, editor *Chemical and Metallurgical Engineering*, New York; A. H. Hooker, technical director Hooker Chemical Co., Niagara Falls, N. Y., and W. S. Landis, American Cyanamid Co., New York.

Secretary—Dr. Colin G. Fink, consulitng electrometallurgist, 101 Park Avenue, New York.

Treasurer—F. A. Lidbury, works manager Oldbury Electrochemical Co., Niagara Falls, N. Y.

Managers—A. T. Hinckley, National Carbon Co., Niagara Falls, N. Y.; W. M. Corse, Monel Metal Products Co., Bayonne, N. J., and William Blum, Bureau of Standards, Washington, D. C.

A report showed that the society's membership on Jan. 1, 1922, was 2219 as compared with 2399 on Jan. 1, 1921. An amendment to the constitution was offered changing the annual dues from $5 to $8 which is subject to adoption by letter ballot.

The formation of an electrodeposition and electrothermic division of the society was announced with Bradley Stoughton as chairman of the latter. This division aims to conduct a symposium at each convention, if possible, on some topic in its field. For the fall meeting in October a symposium in certain phases of electric industrial heating has been suggested and for the spring meeting next year one on the production of the rarer metals and their uses.

At the session on Friday and Saturday general papers on electrochemical subjects were presented by which time the registered attendance had reached nearly 250.

At the close of the annual business meeting President Smith delivered an address as retiring president on "The Technical Man as a Citizen," in which he made a strong plea for more interest in civic and political affairs on the part of technical men of all kinds.

The fall meeting of the society will be held at the Windsor Hotel, Montreal, Canada, Oct. 5, 6 and 7.

ORE RATE HEARING ENDS

President Donner Urges Great Importance of Coal Prices

WASHINGTON, May 2.—Lasting over a period of five days, the hearing before Commissioner E. Bronson Jewell with regard to ex-Lake and Eastern ore rates and rates on fuel to Buffalo came to a close last Friday. Both the Buffalo interests which are opposed to the application of lower ore rates carried in suspended tariffs, and the interests which are seeking these rates, are hoping for an early decision.

The fact that the Public Service Commission of New York denied the application of carriers to restore the higher rates on ore which apply to interstate traffic as the result of suspension of the tariffs by the Interstate Commerce Commission, has led interior furnace and ore mining interests to the belief that the commission will find it necessary to apply the lower rates to interstate traffic, in order to remove the chaotic condition that now prevails. As the situation now is, the lower rates apply on intrastate traffic not only in New York, but also in New Jersey and Eastern Pennsylvania. In addition to this fact, import ore rates are also lower than domestic interstate rates. The Buffalo steel interests, however, lay the blame for this condition upon the railroads themselves, and declare that it remains for them, rather than the Intestate Commerce Commission, to remove the discrimination. They expressed the belief through W. H. Donner, president Donner Steel Co., Buffalo, and others that the price of coal is more important at present than the price of any other commodity in the United States and that for the broad effect it would have upon industry as a whole reduction in coal and coke rates was urged. Interior furnace interests combatted the claim of Buffalo producers that fuel rates to Buffalo are relatively higher than ore rates to interior furnaces and asserted that the contrary is the case and will still be true if the rates carried in the suspended tariffs are put into effect. Buffalo producers favor the same percentage reduction being made on coal, coke and ore, Mr. Donner said, provided the so-called maladjustment arising from the 40 per cent increase is removed. Mr. Donner stated that the Buffalo producers asked first that the relationship existing between the lake front and interior, prior to the 25 per cent freight rate increase of June 25, 1918, be restored. Once that basis had been re-established, he said, similar cuts or increases for all commodities would be on an equal footing.

At the third annual meeting of the Stevenson Gear Co., Indianapolis, at which more than 600 stockholders were present, B. A. Worthington, Indianapolis, president of the Chicago, Indianapolis & Western Railway Co., and Thomas B. Hasler, New York, were added to the directorate. Other directors, G. E. Stevenson, G. R. Stevenson, T. J. Stevenson, Indianapolis; W. C. Starkey, Mansfield, Ohio, and R. T. Wingo, Detroit, were re-elected. G. E. Stevenson is president of the company and Mr. Starkey is secretary. The company has 3000 stockholders.

The Industrial Bureau of the Board of Trade, Baltimore, which has taken a leading part in securing numerous important industries for Baltimore, has been made permanent. It is under the direction of George C. Smith, who organized the bureau three years ago. At present the bureau has a large number of industries interested in Baltimore locations and many of them are expected to locate in that city.

MACHINERY MEN MEET

Manufacturers and Jobbers Hold Meetings at Birmingham

BIRMINGHAM, Ala., May 1.—The consensus of opinion among the delegates to the joint convention of the American Supply and Machinery Manufacturers' Association and the Southern Supply and Machinery Dealers' Association held in Birmingham April 24-26 was that a distinct improvement marked practically all lines and that good business seemed ahead for remainder of the year. Dealers and manufacturers reported a livelier inquiry for goods and general confidence in the future. The optimism was tinctured with conservatism, it being held by many that, after all, it is to be a year of survival of the fittest. The soldier bonus was criticised very generally. Sentiment of manufacturers and dealers seemed utterly opposed to it and they attributed the favor which it has found in congress to fear of group influence on the part of senators and representatives who are acting with an eye on the voter.

Col. Peter C. Knight, of Tampa, Fla., general counsel of the Southern Hardware Jobbers' Association at the Monday open meeting, vigorously assailed the primary system for the election of United States senators.

The open joint session of Monday afternoon was addressed by W. H. Kettig, Birmingham, chairman of the board of the Sixth District Federal Reserve bank; C. H. Huston, assistant Secretary of Commerce; and Dixon C. Williams, of Chicago, president of the Chicago Nipple Mfg. Co.

Mr. Huston declared the Department of Commerce was in earnest about getting close to the business men and business associations of the country and wished them to get in close touch with the department. He insisted on personal contact. He said letters did not suffice. That was only a half measure. He wanted the business men of the country to come to Washington with their problems and to discuss them in person with him and other officials of the department.

Mr. Kettig declared that the Federal Reserve system had saved the country from panics; had rendered them impossible. The danger to the system, according to his view, is the "tendency to bring it into politics."

He held out the hope that "Congress will amend the law so as to make it more profitable to the owners of Reserve banks, so that the entire banking resources of the country will eventually come into the system."

Dixon C. Williams paid his respects to government by groups and to the weak knees of Congress in kowtowing first to one and then to the other, a course of action that produced endless confusion. He believed that if "at the date of the signing of the armistice this country had adopted some form of a League of Nations and remained true to our allies, America would have known far less of disaster and readjustment would have been more easily accomplished, and our future national security more firmly established."

The executive session of the Southern Supply and Machinery Dealers' Association on Wednesday morning was addressed by Robert S. Carter, vice-president, in charge of sales the Whitman & Barnes Mfg. Co. Akron, Ohio, on the "Twist Drill Situation." Discussion of "Standardization of Stocks," together with "Relation of Sales Shipped from Stock to Inventory," was led by J. H. McKinnon, the Cameron & Barkley Co., Jacksonville, Fla. Discussion of "How Best to Handle Credits Under Present Trying Conditions" was led by L. Z. Larzelere of the Farquhar Machinery Co.

T. G. Hyman of Newbern, N. C., was elected president; James Biggs of Sherman, Tex., first vice-president; J. J. Disosany of Atlanta, second vice-president.

Election of officers of the American Supply & Machinery Manufacturers' Association will be held later at the Atlantic City meeting.

Among the subjects of the first executive session of the manufacturers were "Promotion" by Irving W. Lemaux, Indianapolis Brush & Broom Mfg. Co.; "Sales Correction" by S. D. Baldwin; "Publicity" by H. F. Wright; "Foreign Trade" by Chas. W. Beaver, and "Industrial Legislation" by Dixon C. Williams.

Entertainment features were varied and included the ladies as well as the gentlemen. There was a reception and the golf links of the Country and Roebuck clubs were open every afternoon.

Automobile Companies More Active

KALAMAZOO, Mich., May 1.—Employment conditions in Kalamazoo are showing steady improvement, especially in the ranks of the automotive industry, the metal trades and allied industries. This statement is based on talks with heads of various local industries. The paper trade is still spotted and unsatisfactory as a rule, but in the other lines a much more healthy condition exists.

"Help Wanted" signs are appearing over the doors of numerous plants and employment offices are busy placing men. The C. G. Spring Co. is adding steadily to its output and hopes to be able to run it up to an amount hitherto unthought of. Several days during the past week saw 1,000 finished bumpers shipped out, with orders far in excess of the capacity of the plant. One day's mail only brought in orders for 15,000 sets of bumpers.

The Dort motor car body plant is looking for men steadily and with the opening of the plant's paint shop, will require many more skilled men.

Frank D. Fuller, president of Fuller & Sons Mfg. Co., reports an unexpected revival in business. "We cannot take care of our orders and must put on more help immediately," he said.

Other concerns that are reporting a steady increase in sales and production are: Humphrey Co., water heaters, General Gaslight Co., radiant fire heaters, Wales Co., automatic heaters, Clark Engine & Boiler Co., engines and boilers, Michigan Silo Co., silos, Kalamazoo Stove Co., stoves, ranges and furnaces.

Lorraine Iron Production

A marked falling off from the total in 1913 was recorded in the 1921 output of the Lorraine iron mines, though as the year closed production was increasing in the three districts for which data are available, according to a report received by the Department of Commerce from Commercial Attache Huntington, Paris.

In the twelve months of 1921 the Metz-Thionville district produced 7,816,674 metric tons, the Briey-Longwy district 4,819,156 metric tons and the Nancy district 603,644. The Haute-Marne district in the six months, January-July, 1921, produced 13,499 tons.

Stocks on hand at the end of December, 1921, consisted of 1,561,382 tons in the Metz-Thionville basin, 998,761 tons in Briey-Longwy, and 959,072 tons in the Nancy district, with none shown for the Haute Marne, contrasted with 1,673,144 tons on hand at the end of December, 1920, in Metz-Thionville, 397,674 in Briey-Longwy, 972,112 in Nancy, and 9859 tons in the Haute Marne basin.

Labor Leaders Bolt Rail Board Hearing

CHICAGO, April 28.—Evidence that not only the railroads but the railroad unions are dissatisfied with the United States Railroad Labor Board was furnished yesterday when the representatives of the 16 so-called "standard" railroad brotherhoods, embodying 2,000,000 men, bolted a hearing of the board in the Transportation Building. The action was a protest against the admission of documentary testimony by public organizations not parties to the wage disputes. Ben W. Hooper, newly elected chairman of the board, recently upheld counsel for the employees in their contention that outside organizations should not be made party to the disputes, but ruled that these bodies should be allowed to submit written evidence on the grounds that the board should accept all available data.

The American Iron and Steel Institute has moved from 61 Broadway to 40 Rector Street, New York.

More Coal Miners Return to Work

No Decided Change in Situation, Which Presents Some Interesting Features—Violence in Uniontown Section

PITTSBURGH, May 1.—Striking miners in the Connellsville district evidently are to be allowed to decide for themselves when they will go back to work, for while reports are current that this or that company will take steps to hasten the return of those who walked out, the fact is that nothing yet has been attempted by any of the operators. It has been suggested that notices soon would be given the strikers either to go back to work or quit the houses owned by the mining companies and rented or leased to the men; in other words that evictions would be started and houses emptied to provide quarters for those brought in from other places to replace the strikers. This may be the thought of some of the operators, but it is not the idea of the H. C. Frick Coke Co. and of those who would put the plan in operation, none seems willing to be the first. Evictions and the importation of strike-breakers are apt to create a bitter feeling toward the mine owners, not only on the part of the miners, but also the railroad men on the lines serving the district, not a few of whom have had, at one time or another, some experience in the mines. It is feared that under existing conditions, the railroad men might refuse to handle consignments of coal mined by strike breakers. Whether such a fear is well-grounded could be established only by an actual test; nevertheless, it exists and is one reason why the strike is not being more vigorously combatted by the operators. The more important reason, however, is that a leader of such a movement is lacking.

Policy of Steel Corporation

The plan of the Steel Corporation coal mining subsidiary is watchful waiting; in other words, to let the men who have gone out stay out until they want to come back and to use none of the means at its command to force them back. No evictions are planned, except of those who for reasons other than those associated with the walkout, the company does not longer desire upon its payrolls. The agitators have been telling the strikers that the companies did not dare to evict them. This bluff has been called on several occasions and at several different operations in various parts of the district. Men who were disturbers and undesirable from the viewpoint of the companies employing them have been given the word to vacate company houses. But such action has been applied only to individuals and not to groups. The Union organizers, in their speeches, also have been laying much stress upon an assertion that the Steel Corporation could not operate without coal and coke from the Connellsville district. To disprove this is another reason behind the attitude that the Frick company has taken toward the strikers. The Corporation has been a free buyer of coal in the Southern fields and while such purchases, due to the high freight charges to points of consumption, have added very appreciably to its coal bill, the difference between the cost of the Southern coal and that from its own mines in the Connellsville field will have been well spent if the idea that the Corporation is entirely dependent upon the Connellsville field to keep going is dissipated.

Cost of Southern Coal

Incidentally, it may be stated that Southern coal is not nearly as costly, in relation to Connellsville coal, as its present delivered price of almost $6 per ton in Pittsburgh indicates. The Southern coal runs much lower in ash and sulphur than that mined in the Connellsville region. Much of the Kentucky coal coming here and taking the place of Western Pennsylvania coal in other steel making centers, runs as low as 4 per cent in ash as compared with an average of 8 per cent in the Connellsville product and Southern coal usually analyzes about 0.75 per cent in sulphur, as against the ordinary minimum of 1.00 to 1.25 per cent in the coal from the nearby field. The saving in using low ash coal is considerable and of course the advantage of low sulphur coke in making iron is obvious. The Corporation is going far out of its way and also is incurring much expense to clear up any misapprehension in the minds of its men as to its dependence upon Connellsville coal supplies and its course deprives the agitators of the chance to claim that force was employed to bring the men in. Moreover, failure to bring in strikebreakers means less strife and bloodshed, which would make excellent munition for the agitators in fighting for public sympathy.

So long as the leading interest in the Connellsville region prefers to wage a passive campaign rather than one of agression, it is hardly likely independent operators will do other than trail along. As a matter of fact, there seems to be no unanimity among those of the latter group, who are anxious to speed up the back-to-work movement. Some look to the Frick company to initiate the movement, while others feel that an independent company which led the wage reduction movement of last year and whose last cut precipitated trouble and awakened union activities in the region, should take the first step.

Young Leaders

As was commented upon in THE IRON AGE last week, young men are the leaders in the present strike. These include many whose first experience in the mines came during the stress of war and post-war boom demands, who found it possible to earn $7 to $15 a day and such earnings did not entail real effort. When the boom collapsed late in 1920, it was the policy of the Frick company and others to keep on men with families and to lay off the young men without dependents. The latter did not have much employment throughout 1921. This made them dissatisfied and the fact that when they did get a chance to work it was at a lower scale than they previously had enjoyed and that a full day's work was insisted upon for a full day's pay, they eagerly seized upon the union as a means of getting back some of what they figured they had lost. They joined the union and then exerted pressure upon the older men, who though not anxious to quit for family reasons, have stayed away because they did not want to be termed "black legs" or some other name equally onerous.

Union organizers usually claim every man not at work as a striker, but they cannot claim more than a small percentage of those now out as members of the union, and as was the case in the steel strike in 1919, a good many who have signed up and paid the enrollment fee later will do a little charging off of this fee to profit and loss, when they discover that everything is going out and nothing coming in, at least not from the union. The fees paid by those who have just gone into the union are needed to maintain those who collect them.

Production Increasing

As far as the strike in western Pennsylvania is concerned, there has not been much change one way or another. As pictured by the loadings on the several railroads serving this district, the situation is improving from a production standpoint. Normal daily loadings of coal of the Pennsylvania Railroad (Central Region), the Pittsburgh & Lake Erie Railroad, the Monongahela Railroad, the Montour Railroad and the Pittsburgh & West Virginia with the West Side Belt Line, aggregate approximately 8000 cars. Loadings in a single day, since the outset of the strike, have been as

low as 1200 cars, but lately they have been running pretty consistently above 1800 cars a day. This is a pretty good showing when allowance is made for the union mines in the territory embraced, from which no production was to be expected.

More men are reporting for work almost daily, but as yet no big break in the strikers has occurred in the non-union fields and union mines still are down tight. Locally, the strike in the union fields is overshadowed by the trouble in the non-union districts, because so much coal used by the steel companies here and in nearby districts comes from the non-union mines. In connection with the strike in the union fields is a revival of the report that Frank Farrington, head of the United Mine Workers of America, in Illinois, will bolt and sanction a conference between operators and miners' representatives in that State to negotiate a district scale. This report emanates from labor circles and if true would be a body blow to the national body, since it might force district scale agreements elsewhere, for which the operators have been fighting.

Women Lead in Rioting

UNIONTOWN, Pa., April 29.—This week has been marked by rioting in the Connellsville bituminous region of which the most serious occurred to-day at Tower Hill No. 1, when four State poilce and half a dozen strikers were listed among the casualties. At Orient a mob of strikers attacked Louis Hill, a deputy, while Hill and his wife were walking to the company store. He was overpowered but succeeded in pulling his gun and firing, a striker being struck in the leg. A stray bullet caused a flesh wound on a two year old baby.

Charges of inciting to riot will be lodged against prisoners in the county jail as a result of the rioting and in at least one instance it is expected that felonious shooting will be added to the charges.

Fifty prisoners, men and women, were brought to the county jail in trucks this afternoon from Tower Hill No. 1. They will be given a hearing later. One State trooper was shot above the left knee and is the most seriously hurt. Lieut. Charles L. Smith, in charge of the detachment which went to the mine, had his left eye laid open by a brick and for a time physicians feared that he would lose it. There were 500 or more of the mob, including strikers and their wives. The riot is said to have resulted from reports that a number of men expected to return to work.

Two riots occurred, one Thursday and the other Friday, at Tower Hill No. 2. Women led these attacks upon men who are working under regulations of the union to keep the plant property in shape. Salt and pepper was thrown at eyes of the men while clubs and pokers also were used as weapons. Several arrests were made and fines of $10 and costs in each case were imposed, the fines and costs being paid by union committeemen at the plant.

At the hearings, the women said they were hungry and that if their husbands could not work it was unfair for other men to work.

There are evidences in that region of a swiftly growing sentiment in favor of returning to work. This is believed to be admitted by union leaders in the scheduling of mass meetings at various sections of the county to sustain interest and "backbone" in the strike. The largest of such mass meetings was held at Uniontown on Friday afternoon when some 5000 people attended, including scores of operators, clerks and business men.

Your correspondent has had reports of several groups of men who have asked to return to work. At one of the smaller plants in the region this week, the men met with the operator at the plant and asked to return to work with protection. They said they were afraid. The operator told them he thought they objected to having deputies at the plant. This was what they wanted, they said. The plant is operating under that basis, the men working at the same scale as before they laid down their tools.

Springfield Shops Closed

The Boston & Albany Railroad locomotive shops, Springfield, Mass., have been closed for an indefinite period, throwing some 400 mechanics out of employment. The shutdown is credited to a lack of repairs necessitated by the falling off in the average daily haul of coal, as a result of the coal strike.

PRICES FIRMER

Order Books in Youngstown District Are Well Filled

YOUNGSTOWN, May 2.—In the fifth week of the coal miners' strike, steel plant operations are being carried forward in the Youngstown district with little restrictions. Mills' order books are well filled despite the substantial operating rate, and new business replaces tonnage as rapidly as it is worked off. Prices are stiffer in all directions. Some interests predict $27 pig iron before the end of the second quarter and $37.50 sheet bars. One sale of sheet bars at $36 is reported, but new business is mostly commanding $35.

Firming of the sheet market and sustained demand have produced a more substantial requirement for sheet seconds, cut-downs and plate ends. Seconds are purchasable from the mills at $35 to $38 per ton, while plate ends command from $25 to $26. One lot of No. 30 gage sheet cut-downs was sold last week by a warehouse interest to a consumer at Cincinnati for $50.

Quotations from all Valley independent sheet makers show that no new business is being accepted for less than 2.40c. for blue annealed, 3.35c. for black and 4.30c. for galvanized, base gages. Sales at 2.60c., 3.50c. and 4.50c. for the respective grades are not uncommon, for spot delivery.

In some directions, there appears to be less insistency on the part of manufacturing consumers for finished steel and specifications show a moderate dropping off. Producers are less concerned over the coal situation than they were a week ago, though less fuel is coming into the district.

The heaviest loss in revenue freight movement occurred in the third week of the month and coal carrying roads show the largest loss. The Ohio Region of the Erie moved an average of 4000 loaded cars daily in April, a decrease of about 10 per cent as compared with March and a gain of 15 per cent over April, 1921.

A Valley independent whose Pennsylvania coal mine has been forced into suspension by the strike will not resume production at the property before 60 days, having made arrangements elsewhere for its coal supply. In this district, makers believe that conditions at the mines have passed their worst stage.

West Virginia and Kentucky coal is available in quantity, but at higher prices than some interests are willing to pay. One mining company in southern West Virginia, for instance, has been offering 700 to 600 tons daily of good grade gas and steam coal at $3 per net ton, during life of the strike, or on one-year contract at $2.30 per net ton, both prices f.o.b. mines. Valley mills, however, were unwilling to go above $2.75 per ton for an aggregate of 50,000 to 60,000 tons, and one interest offered $2.60. The mine was willing to guarantee against any kind of labor trouble and furnish performance bond if required.

Freight charges to Youngstown from West Virginia territory aggregate $2.66 per ton, and to Niles $2.81. A Niles sheet interest employing powdered coal, operating its own pulverizing machinery, is fully covered on its coal needs for three months, with additional supplies coming in.

Shortage of sheet bars is slowing up some sheet and tin plate interests, but mills are making every effort to supply needs of their regular customers, covered by contract. This situation was one of the factors which last week caused temporary suspension of a sheet producing interest at Canton.

Additional hot metal produced by the second blast

furnace of the Brier Hill Steel Co. will be largely used in its open hearth furnaces, and the steel converted into sheet bars. Very little pig iron tonnage has moved from the Valley in the past ten days and iron is becoming increasingly difficult to obtain. The new stack of the Trumbull-Cliffs Furnace Co. at Warren, originally lighted Jan. 16, has produced up to 721 tons in a 24-hr. period, surpassing its previous high record of 711 tons. Coke for this stack is being furnished by the Youngstown Sheet & Tube Co., which in turn is being supplied with considerable coal from accumulated stocks at the mines of the Trumbull Steel Co.

VISIT NEW DEPARTURE PLANT

Steel Treaters and Mechanical Engineers Hold Spring Inspection Meeting at Bristol Works

More than 250 metallurgists, engineers and guests of the Hartford chapter of the American Society for Steel Treating and the New England sections of the American Society of Mechanical Engineers assembled at the main works of the New Departure Mfg. Co., Bristol, Conn., April 29. The plant was inspected in groups of 15 under the company's guides and occupied the entire morning. The principal output of the company is ball bearings, of which it is said to be the world's largest producer, and the largest producer also of bicycle coaster brakes and accessories. The history of the company extends over 33 years. Since 1919 it has been a subsidiary of the General Motors Corporation.

The forge plant, located about one-half mile from the main plant, was the first unit visited. Buildings at the right adjacent to the railroad were pointed out as general storage for the consumption of the entire Bristol plant, the material being received on freight cars, unloaded and stored. The bar shed is 75 by 125 ft. and equipped with a crane for unloading of bars directly from the cars and placing them in the raw material stores. The crane is used also in delivering material for the forging operations in the shop opposite.

The Forge Plant

The forge shop which is 125 by 475 ft. is equipped with 35 large forging machines, many of them weighing upward of 80 tons each. The equipment includes drop hammers for drop forging of bicycle coaster brake parts and similar work.

The forging is started by heating the bar in furnaces of the company's design, the bar being then upset in dies by endwise pressure, thus forging the bar endwise which had hitherto been worked entirely longitudinally. In the first operation a collar is raised up on the end of the bar and in the second punched off, leaving a completed ring. The steel used is electric furnace high carbon chrome containing carbon 1.05, chromium 1.65 and phosphorus and sulphur, below 0.03. Butt ends remaining after the forging are reheated and re-rolled into smaller bars in a 3 high, 2 stand rolling mill in the building. The heat for the entire plant, and the electric control is from a boiler house at the left of the building. It was noted that the machines were driven by individual slip ring motors, belt connected, and it was explained that this type of drive had been found the most satisfactory. An interesting feature of the forge plant was that artificial ventilating was not required, there being sufficient movable glass in the roof to the equivalent to the removal of half the roof.

The next unit visited was the die-hardening room, in which all furnaces excepting two electric furnaces were of the company's design. In the die shop adjourning, dies are made for use in forge shop. This building is arranged in two heights, the smaller machinery being grouped in the lower part and the heavier machinery in the higher.

The route of the forgings is from the forge plant to the main plant, where they enter the annealing building. They are first normalized in special furnaces of the company's design and then annealed in a battery of 53 furnaces, also of the company's design. In this process two large pots containing forgings are loaded by an overhead crane, each furnace charge consisting of slightly over two tons. In these furnaces from 106 to 150 tons of steel are constantly undergoing annealing. The forgings are pickled in a room adjoining.

Heat Treating of Race Rings Inspected

At this point, following the route of the ring forgings was interrupted, and the heat treating operations on the finished machined pieces inspected. The building in which this is done contains the hardening and carborizing furnaces, all of the company's own design. The small loss of heat from the furnaces due to insulation with Armstrong cork brick, was very noticeable. The rings are strung on wires, then placed in the furnaces and heated for a standardized time in comparison with a pyrometer at the end. The rings are then quenched in agitating tanks of quenching oil, the work falling on an oscillating grid, automatically agitated, obviating any chance of human laxity. The control of the furnace fire is not in the hands of the operator, but by operating foremen called firemen, who regulate temperatures in accordance with what the pyrometer signals.

The carborized work coming from the furnaces is handled mechanically and cooled in an adjacent shed. After dumping, the empty pots are taken back to be repacked. Only coaster brake parts and certain parts of bearings are carborized, the majority of parts being of high carbon steel.

The next unit visited was the tempering building in a section of which work to be carborized is first japanned, baked in electric ovens and plated in the company's automatic plating machines. Another section contains the tempering ovens. Instead of the work being tempered in oil as formerly, the company in conjunction with the General Electric Co., has worked out a novel application of electric heat. The work travels back and forth through this oven, the tempering being effected by heated air, automatically circulated and automatically and pyrometrically, electrically controlled. The maximum variation from fixed temperatures in any part of the furnace was said not to exceed 3 deg. The work proceeds from this point to the grinding operations.

The pyrometer control room was inspected with interest. From this room all of the 250 furnaces are pyrometrically controlled, the apparatus used being of the company's specification and installation and of Leeds & Northrup manufacture. Pyrometer repair, manufacture of hot ends and standardization of thermo couples is carried on in an adjoining room. The chemical and metallurgical laboratories together with the balance room were inspected.

The Ball Plant

The entire ball plant contains in one building over 6 acres of floor space and is said to be one of the largest, if not the largest, in the world. It has a production of 20,000 lb. daily. All sizes are made from ⅛ to 2 in. in diameter. There are four floors, the ground floor being 220 ft. wide by 460 ft. long. The machinery employed in most of the operations is of the company's own design and manufacture.

The fourth floor is over an acre in extent and is devoted to rough grinding. The machines are continuous and automatic. The balls, in lots, as they come from the first operation proceed through all succeeding operations in lots of about 250 lb. each. The grinding is by an abrasive wheel, balls in a stream passing over the face of this wheel are ground in a soft state to within a few thousandths of finished size. After the rough grinding the balls are normalized and annealed, and then hardened on flat nichrome trays, two or four trays to a furnace. They are then quenched in deep tanks which extend through to the floor below.

The third floor is devoted to finish grinding and contains upward of 1½ acres of floor space. Here

the hardened balls are lapped continuously and automatically between groved iron plates between which a thin abrasive compound is passed. After grinding they are put in tumbling barrels near at hand and wiped with sawdust and fine leather to remove all traces of abrasive.

The balls are given inspection for service perfection on the second floor. Each perfect ball passes through the hands of five consecutive inspectors. Perfect balls are gaged here for size to ten thousandths of an inch and sorted into containers. Throughout the process the balls are checked for sphericity. The limit is an eighth of a ten thousandth of an inch. Operators are given 15 min. rest each half day and the large and well appointed rest room was a subject of favorable comment.

The hardened race-rings were then followed into the semi-final grinding department. This building is 130 ft. wide by 300 ft. long. The first operation is surface grinding, then internal grinding, then oscillation of the race groove. Inner races are bore ground. Each operation is followed by rigid inspection. A large shop is given over solely to the manufacture of gages.

The production, cost accounting and engineering offices in the administration building were inspected. Considerable interest was shown in the planning and scheduling boards. In the upper floors bearings are assembled.

The last unit in the inspection was the central heating plant which is equipped with Babcock & Wilcox boilers, Taylor stokers, overhead bunkers, etc. Tunnels throughout the plant carry the heating system to the farthest buildings. Refrigeration is also provided here for the Endee Inn.

The Endee Inn is an employees hotel built to house 314 men and, as assistance to the housing facilities to meet the company's operations in Bristol. The company is also an extensive builder of houses and owns in whole or part upwards of 700 houses. The number of employees at present about 3000.

Afternoon Meeting

At noon a buffet lunch was served at the Endee Club. The afternoon was devoted to an educational session held in the assembly hall of the Endee Club with F. P. Gilligan, national president, American Society for Steel Treating, in the chair. Addresses were made by W. H. Eisenman, secretary of the society, on "Heat Treatment," and by Prof. H. F. Moore, University of Illinois, on "Fatigue of Metals."

MACHINE TOOL BUILDERS

National Association Meeting at Atlantic City—Standardization Considered

The National Machine Tool Builders' Association, at its spring meeting on April 18 and 19 at Atlantic City, N. J., revised its constitution and by-laws providing larger assessments upon members to carry on the statistical work which has been inaugurated during the past week under the direction of Ernest F. Du Brul, general manager of the organization.

Both A. H. Tuechter, president of the association, and Mr. Du Brul laid great stress in their addresses, which were published in last week's issue, upon the need for such statistical information as the association is now giving its members. Had the members been in possession of such information in 1919 and 1920, Mr. Tuechter said, much of the heavy losses which the machine-tool industry has suffered would have been obviated.

Following a discussion of standardization of machine tools, President Tuechter was authorized to appoint a committee of five members to work with a committee of the American Society of Mechanical Engineers on the standardization of small tools and machine-tool elements. This committee will be announced later by Mr. Tuechter.

Sectional committees organized under the rules of the American Society of Mechanical Engineers are always made up of representatives of three groups: Producers, consumers and general interests. This sectional committee is being organized with the National Machine Tool Builders' Association and the American Society of Mechanical Engineers as joint sponsors at the request of the American Engineering Standards Committee. In making this request the American Society of Mechanical Engineers was influenced somewhat by the fact that similar standardization activity is being carried on by the British and the Swiss. Some time ago both the above mentioned organizations accepted sponsorship and a few members of the sectional committee have already been selected. In addition to the members representing the two sponsor bodies, all societies and associations whose members are in any way interested in this project are asked to appoint representatives to the sectional committee. Requests for information concerning this matter should be referred to either E. F. Du Brul, general manager of the National Machine Tool Builders' Association, 817 Provident Bank Building, Cincinnati, or C. B. LePage, assistant secretary of the American Society of Mechanical Engineers, in charge of standards committee work.

The great possibilities of standardization in this field were brought out by one speaker after another. Mr. Du Brul told about the investigation which he had been making on the size of T slots. The universal character of this piece of standardization was made clear. Some of the machine tool parts and dimensions which should receive the attention of the committee and which were pointed out by one or more of the speakers during the conference are listed below under the head of the tool to which they apply.

Lathe

1. Tee (T) slot standard.
2. Standard rating. (What is a 14-in. lathe?)
3. Nose piece.
4. Bolt heads and nuts.

Planer

1. Tee (T) slot.
2. Spindle nose.
3. Taper.

Milling Machines

1. Tee (T) slot.
2. Spindle ends.
3. Angle blocks.
4. Bolt heads and nuts.

Drills

1. Tee (T) slot.
2. Bolt heads and nuts.
3. Distance between housing.
4. Length of bed.

Boring Mills

1. Tee (T) slots.
2. Ram and turret tool holders.
3. Diameter of hole in table.
4. Bolt heads and nuts.

The sectional committee in determining the elements of the machine tools which are to receive its attention will confine itself almost entirely to those which are classed as tool and work holding elements.

After a full and free discussion of the subject, it was agreed that a Plan and Scope Committee be first organized to make a careful survey of the field which is to be covered by the work of the sectional committee and to assist in determining its personnel. It was agreed that this committee should consist of five representatives of the Machine Tool Builders' Association and five representatives of the American Society of Mechanical Engineers. It was further decided that the Machine Tool Builders' Association representatives should be drawn one each from the manufacturers of the following five types of machine tools.

1. Planing.
2. Work revolving.
3. Tool revolving.
4. Grinding.
5. Punching and forming.

The dealers also are to be asked to co-operate by making suggestions for the use of the committee and by assisting in the promulgation of the standards when they are developed.

The use of the preferred numbers in deciding on the sizes of machines and elements was talked over and both F. O. Hoagland of the Reed-Prentice Co. and E. F. Du Brul strongly recommend their use. These preferred numbers are the ones now being advocated by the American Engineering Standards Committee.

Industrial Engineers Meet at Detroit

National Organization to Try to Decide on a Standardized Method of Measuring Efficiency of Management—Relations of Industrial Engineering, Capital and Labor

GEARING the power of industrial engineering science to the wheels of American productive enterprise, with a view to making the machinery run more smoothly, efficiently and economically, was the primary purpose of the eighth national convention of the Society of Industrial Engineers, held at Detroit on April 26, 27 and 28. The major subject was stated as the influence of industrial engineering upon the earnings of capital and labor.

"It was our aim," explained President Joseph W. Roe, New York, "to take up the discussion of industrial engineering from the angle of the man who's got to work the thing." In carrying out this purpose, the program was arranged so that most of the leading addresses were made by industrial executives and engineers directly connected with business, rather than by the consultants who make up a large part of the membership of the society.

The next national meeting will be held in New York in October, the major topic selected being "The Economics of Industry."

At the opening session held on the afternoon of April 26, President Roe in an address emphasized the practical purposes of the convention. His subject was "The Measurement of Management." "How can industrial engineering best serve industry?" he asked; and he answered his own question by saying, "Industrial engineering can best serve industry by formulating a standardized method of measuring the efficiency of management. What is perfect management? In the words of the farmer at the zoological garden, 'There ain't no sich animal,' but if there were what would it look like?"

Mr. Roe then outlined the characteristics of an ideal 100 per cent management, including perfect purchase and delivery systems; processes of unquestioned efficiency; the utilization of 100 per cent of the equipment all the time; the utilization of every labor hour for which wages was paid; product so perfect that every piece would pass inspection; the marketing of goods at the best prices and lowest selling costs to customers, all of whom were certain to pay their bills. and the maintenance of adequate reserves.

He outlined possible methods of standardizing tests which would show the extent to which management of individual enterprises approximated this ideal of perfection, and concluded by suggesting that a joint committee from the Society of Industrial Engineers, the Taylor Society and the American Society of Mechanical Engineers set to work to formulate a definite system to be recommended to American business.

An address by Col. Benjamin A. Franklin, vice-president, Strathmore Paper Co., was on the subject "How Industrial Engineering Serves the Chief Administrator." The chief administrator, said Colonel Franklin, "must be an industrial engineer himself, or surround himself with industrial engineers. The value of advice from the outside consultant is unquestioned, but a system once installed must have constant supervision from inside the organization. The events of 1921 showed that the amount of business foresight in the United States could be measured by a very small standard. If industrial engineering doesn't do anything else, it helps to increase profits."

The long-smoldering feud between psychologists and character analysts created a diversion, when Dr. Henry C. Link, New York, addressed the society on psychological tests for employment. Referring to systems of character analysis by observation of physical characteristics, handwriting and other elements of personality, Dr. Link took occasion to observe that "the people who believe in those methods are usually people who lack the background of knowledge by which they could prove that those methods were false. We can't take time to instruct those people in psychology, biology, physiology and the two or three other sciences which prove beyond question that these systems of character analysis have no merit." Harrington Emerson, a veteran in industrial engineering practice, took issue sharply with Dr. Link and was supported by C. E. Knoeppel. John Calder and others came to Link's support.

An address which attracted considerable attention was that of E. W. Hulet, vice-president, White Co., Cleveland, on the subject "How Industrial Engineering May Serve the Executive." Mr. Hulet described the research work conducted by the White Co. in its efforts to forecast the trends of industry. He advised industrial engineers to confine their efforts to distribution and service, explaining that by distribution he did not mean actual selling processes. He expressed his views as to the value of an engineer's training in the conduct of human relationships by saying "I'd be afraid to trust you with human relations in a factory that I had anything to do with."

Wage Reductions Under Employee Representation

A group meeting that attracted wide interest was that of the industrial relations section which discussed experiences with employee representation plans during the period of business depression. John Calder, director of industrial relations, Swift & Co., led the discussion with a thoughtfully worked out paper in which he described the purposes, origin and administration of the joint representation system of that packing firm. He detailed the negotiations which resulted in wage reductions by agreement between employees and management. Mr. Calder believes that a method of employee representation, wisely planned and administered with intelligence and good faith, will go far toward solving the labor problems of an industry. He does not think, however, that representation will end unionism or that it ought to do so. "Unionism has rendered invaluable service to labor," he said, "in raising the status of the worker in the face of indifferent ownership, and it will always be on the heels of the illiberal employer, but as it has reached only one in eight of the 41,000,000 persons gainfully employed in the United States, it is foolish to insist that in any industry unionism must rule or ruin, for like capitalism it can only commend itself in the end by good works." Parts of Mr. Calder's address are given elsewhere in this issue.

In the course of the discussion of Mr. Calder's paper, E. S. Cowdrick, Denver, who served as chairman of the meeting, was asked to relate the labor experiences of the Colorado Fuel & Iron Co. during the period of business depression. He described the methods by which wage reductions, made necessary by changing business conditions, had been brought about through agreement between employees and management under the company's industrial representation plan. He added that the nation-wide coal strike which began April 1 had been almost wholly ineffective at mines of the Colorado Fuel & Iron Co., only two mines having failed to operate continuously so far in the strike.

A largely attended banquet meeting was held on the evening of April 27, with President Roe as toastmaster. Robert B. Locke, director and manager of the Federal Reserve Bank, Detroit, spoke on "The Need of the Hour," which he interpreted as being a wider dissemination of economic knowledge. "We are living in an age of propaganda," he said. "Much of this propaganda is based upon economic fallacy and is calculated to arouse class against class." He urged the education of workmen particularly in the principles of sound economics and business facts.

Howard E. Coffin, vice-president, Hudson Motor Car

Co. and formerly chairman of the advisory committee of the Council of National Defense, fairly staggered the industrial engineers with an array of facts relative to the recent developments in aviation, particularly as applied to naval warfare. He showed a series of moving pictures taken by the Navy Department, illustrating the destruction of warships (including one highly modern fighting machine belonging to the former German navy) by bombs dropped from aeroplanes. Mr. Coffin's conclusion was that in any future war a navy would be useless unless it could control the air above the ocean. Mr. Coffin also believed that there would be no more inter-continental wars; that with the present development of air fighting it would be impossible to transport troops across the ocean.

The education group at a sectional meeting presided over by Charles W. Lytle, industrial engineering department, New York University, discussed the problems of industrial education in the small manufacturing plant. The conclusion was reached that in concerns too small to afford regular educational departments, responsibility for training of workmen and officials should be definitely assigned to some one man in the organization, and that much of the work should be done through co-operation with the public schools, the Y. M. C. A. and other agencies.

Managerial Red Tape

A sectional meeting of the managing executives' group was given over to a discussion of managerial red tape. The discussion was led by Stanley P. Farwell, vice-president, Bureau of Commercial Economics, Chicago. The executives set about to find means of distinguishing between "red tape" which is necessary and that which serves no useful purpose. It was agreed that the useful variety of red tape includes budget systems, departmental reports and certain classes of statistics.

Some of the speakers emphasized that often what appears to be useless detail is really a good investment because of the benefits of the control which it provides over production, sales and other activities, and the aid which it gives to proper planning. It was suggested that useless red tape often results from the survival of reporting systems which originally had some real, but transitory, purpose, and that many obsolete forms can be eliminated by periodical surveys of a firm's accounting system.

A decided innovation was provided by one session at which the general subject of conservation of plant and equipment was discussed by equal numbers of workmen and production managers.

In the course of this session F. H. Low, superintendent of branches of the Ford Motor Car Co., announced that in the future all branch factories erected by the Ford corporation will be one-story buildings.

A dinner meeting was conducted by the committee for the elimination of fatigue, under the chairmanship of Dr. Frank B. Gilbreth. At this meeting a general invitation was issued to all industrial companies to report to the committee any fatigue-saving methods and devices which they may have originated or have adopted.

The Industrial Engineer Establishing Himself

A feature of the closing session, on the evening of April 28, was an address by Norval A. Hawkins, Detroit, sales manager of the General Motors Corporation. The Detroit man urged the industrial engineers to give more attention to "selling" their methods to workmen and managers. "The ordinary workman swears at you as his worst enemy, and the average employer looks upon you as a theoretical 'nut,'" said Mr. Hawkins. "You don't think enough about selling your ideas to those employing you. You must be first-class salesmen before you can be first-class industrial engineers. It is just as important to get your ideas over to the other fellow as it is to originate the ideas.

"Efficiency is a human problem; man is the unknown quantity in the field of industrial management. Man has the power of continued and unlimited change. He can't always be depended upon to be a cog; he may suddenly change into a monkey wrench and disrupt the machine."

Other speakers at the closing session were S. A. Courtis, director of research, Detroit public schools; Yoici Uyeno, of the Institute of Industrial Psychology, Tokyo, and Daniel B. Gauchet, general works manager, Edison Electric Appliance Co., Chicago.

The board of directors, at the suggestion of the delegates from city chapters, appointed a committee of seven to report on "aims and organization."

The society instructed President Roe to meet with other engineering bodies in an effort to decide upon a standardized method of measuring efficiency of management.

Plant inspections included visits to the Ford Motor Car Co., Detroit Steel Castings Co., Hiram Walker & Sons, Ltd., Cadillac Motor Car Co., Central Forge Co., Detroit Vapor Stove Co., Detroit Pressed Steel Co., Michigan Stove Co., Burroughs Adding Machine Co., Hudson Motor Car Co., etc.

Registration was about 400. General arrangements for the convention were made by George C. Dent, business manager, and the local arrangement and entertainment program were in the hands of the Detroit chapter, of the Society of Industrial Engineers.

What Employee Representation Has Done and Can Do

John Calder, manager of industrial relations, Swift & Co., Chicago, in presenting his paper on "Experiences of Swift & Co. with Employee Representation Plans During a Period of Business Depression," said that it was the first account of the operation of employees' representative assemblies at 19 of the larger Swift & Co. plants. He told of the conditions in the packing industry before and during the term of the Federal administrator. For more than a decade the company has been studying intensively the problems of industrial relations, and it was the first to recognize in 1912 the desirability of a steady job in an industry whose supply of raw material constantly fluctuated. It then introduced the minimum earnings of 40 hours to all on the payroll of any week, regardless of whether that number of hours had been worked or not. In January, 1916, it raised this guarantee to 45 hours and this continued until 1918 when the Federal administrator for war purposes reduced it to 40 hours to agree with the reduced standard week of 48 hours.

The termination of Federal administration presented the opportunity for introducing the employee representation plan. Swift & Co. pursue an open-shop policy with no discrimination whatever as to what an employee's position is in relation to organized labor. Some of the organized men have been among the best employees and have also acted as elected representatives in the assembly, under the representation plan, and here they have expressed themselves with entire freedom and acquired much information.

The speaker explained in detail the Swift representation plan, which, in brief, provides for joint conference, with power to effect binding decisions by a two-thirds vote of equal numbers of appointed management representatives and elected employee representatives, and joint committee work on all details with power to effect decisions where the committees are unanimous. The plan was outlined in THE IRON AGE of May 26, 1921. In the year that has elapsed since the first elections for employee representatives, over 320 cases have been raised in 19 plants and disposed of, 70 per cent of the decisions being in favor of the employees. Of the 320 cases, 186 were handled by joint representatives in voting divisions; 74 were handled by full assembly; 58 by committees and one was withdrawn. The main issue raised was that of a reduction in wages from the high rate of 45c. an hour for common labor. The speaker described the procedure—how documentary and other evidence was submitted by the company relative to wages paid in other industries, changes in purchasing power of the

wage, trend of prices, trend of labor efficiency, changes in economic factors in the Swift business, comparative increase in cost of living and wages paid to unskilled labor by Swift & Co., and other cognate data.

The particular wage reduction in question concerns only 13 plants out of 19 having assemblies. There was full investigation by the committee on working conditions, and while the employee representatives in the beginning had doubted the necessity for a reduction, the committee reported unanimously that the proposed reduction was necessary and fair. Seven of the 13 assemblies concerned voted by more than the required two-thirds majority in favor of a specific wage reduction; the other six left the matter to the management on a known basis on a vote of confidence. Seventy-five per cent of all employee representatives in the 13 plant assemblies voted favorably. Meanwhile a general strike was called by the national union officers of an organized minority of the employees, which at the same time was represented in the assemblies. As soon as the personal liberties of the employees were assured by the authorities, every one of the plants was working at normal capacity and in less than three weeks this was attained in all places.

The second portion of Mr. Calder's paper, which deals more generally with employee representation, is given in full below. Since Mr. Calder's experience in plant management in the past 25 years was almost entirely in the metal-working industries, his views are of particular interest to readers of THE IRON AGE:

Education the Greatest Need

It is frequently asked, What has been learned from the experiences with employee representation on an extended scale throughout the country? The following are answers to some of the questions raised:

1. The most important thing that has been learned is, Educate; educate; educate! This cannot be emphasized too much. Not till an attempt is made to sound the depths of the truth labor does not know and should know about our social system, and the falsehood labor believes and should not believe, and the things the employer should know and does not know, will come home the folly of the stand-pat policy of resting easy because the management is sure of its integrity and the fairness of its actions, and the economic situation gives labor occasion to pause. Needless to say, nothing helpful can come out of the still greater folly of reactionary and repressive measures labeled American by their originators, and arising out of unpleasant experiences of capital and labor with each other. In that direction there is no solution of the labor problem, but unfortunately it is the one taken by some influential employers, with a host of semi-indifferent ones trailing along.

2. The second thing learned is the amount of distrust existing among workers because of the lack of knowledge of the facts of the particular business which provides them with a living. For that lack the employer is responsible. We find labor is taught by its professed friends to have a foolish distrust of economics; to regard economics as merely arbitrary rules devised by capital which constantly operate against labor; whereas it is only the contemporary explanation of how our social system works, and its rules are not immutable. Some of them will change as we change and elevate our motives. None of them will change merely because we choose to alter the form of our system. That will effect no miracle, as Russia has amply proven.

Nevertheless, our social system in the end must justify itself to the majority of our people or it will go under. And it can justify itself. Undesirable conditions in the packing industry disappeared years ago and the descriptions of them were always exaggerated. They are still the stock-in-trade of people who make it their business in life to point out the vulnerable joints in our social armor. This is a useful service to society and the only regret is that some of those engaged in it help but little because they learn nothing and forget nothing.

Swift & Co., before touching employee representation on a large scale, spent nearly two years and over $100,000 in educating its 4000 foremen and executives in modern production methods and in better ways of handling the human factors. It took no chances in having to pair in the assemblies any "hard-boiled" management people with inquiring and independent elected employees facing a new experience and a grave responsibility. A great deal of credit for our happy labor relations belongs to our tactful, energized, enlightened and sympathetic foremen and executives who *are* the company for all practical purposes in the eyes of the ordinary worker.

Will Workers Vote for Lower Wages?

3. The third question answered is: "Will a body of workers vote itself a reduction of wages?

This was the scornful challenge of skeptical official labor, and its answer was: "Never!" But our experience is that it will usually do so whenever it has confidence in the management and due cause is shown. In the process of doing it our labor was sad, but not sore; reluctant, but not unconvinced. What more could be asked? Is not such a result where it is absolutely fair in the eyes of both parties a real collective adjustment? Is it not better than trading labor's interests on terms which are not based on any adequate recognition of the facts and on which the workers immediately concerned have actually no determining voice? Is it not better than making every adjustment necessarily a fight; sometimes a purely factional fight between rival unions, sometimes between rival leaders of the same union; a fight in which, if labor loses, it is nearly always claimed that it has been robbed, and if it gains it claims that it did not receive justice?

Will Not Destroy Unionism

4. *Will not successful employee representation destroy unionism and should it not be opposed everywhere on that ground?*

It is not likely to destroy unionism. In our industry we have been confronted by a condition, not a theory. The minority of organized labor which existed in the industry never showed much desire to co-operate with the employer before representation of the whole body of the employees was provided. But all recent elections for positions as employee representatives have been keenly contested and 100 per cent voting has been the rule in the election division of the plants. Our plan, however, does not prescribe or anticipate the ultimate form which labor relations may take in our evolving industrial process.

A labor leader said to the writer after he had satisfied himself as to the genuine democratic and educative nature and working of our employee representative assemblies: "If this thing spreads, my job is gone." But he was wrong, nevertheless. His job, if he were fully equal to it, would not be gone. It would simply change to something more constructive. We can even imagine him appearing before a representative plant assembly on its cordial invitation to contribute any evidence or argument in labor's interest on some important issue on which any of the employee representatives considered him to be an authority. He would appear, however, before a very different and more informed body of employees than is usual in the ordinary meager union-hall rally of to-day. Yet he would have a real opportunity for making his points—an opportunity far superior to the heated interchanges, exaggerations, and threats that too often constitute the process by which plant executives and union officials "recognize" each other at considerable intervals.

The representative of organized labor, despite the existence of a democratic body in each concern settling plant matters, if possible, through joint conference and joint agreement, would also have a real job in reconciling labor's wider interests with legislation and in promoting its external solidarity in many other ways. If such an individual were of the caliber to command the confidence of a considerable majority of the employees in a plant and of their elected representatives in an assembly, then the latter would be the union for all practical purposes in that plant and the union would be in the assembly, and would be dealing with a more representative group on the employer's side than it ever does at present. In other respects a plant assembly

would be needed, even with an ascendency of organized employees, because such assemblies take note of and decide wisely on a host of things in which workmen are personally interested and to which the ordinary labor leader, touching only the high spots of economic friction, often will not pay any attention. Assemblies of the joint conference character also educate the employer very effectively. It was not wholly the fault of the unions formerly that there was no co-operation in the plant itself, but if the union fails to rise to its opportunity now and co-operate constructively, even where it is in a minority, it will fail and it will deserve to fail.

5. Will labor, if it is convinced that it is getting a real square deal and is given every chance to have a voice in what that deal will be, begin to take a constructive interest in the day's work?

If by good management and with the consent of the governed there is restored some joy to the job, we think labor will co-operate with management in "making goods plentiful and men dear."

6. What Should Constitute Good Employee Representation?

(a) Any proposed plan of employee representation that does not include man-to-man discussion regarding every employee interest, without exception, and definite powers of decision, is not democratic in spirit and will not be acceptable to labor.

(b) Joint representation is necessary if there is to be a mutual and beneficial educative effect upon employees and management. Both need it and the day of two hostile camps should be left behind.

(c) Any plan of representation within a plant which, as a condition of its existence, excludes from employment organized men or forbids or inhibits directly or indirectly the free expression of opinion by such employees, or by any dissentients, whether majorities or minorities, will fail to attain success.

(d) No plan of employee representation will command the confidence of either organized or unorganized employees, if it is essentially or chiefly a union-fighting or union-destroying instrument. The sincere employer will find that a genuine democratic assembly is a far more enlightening and educative body than the average union of to-day which has little interest in the truth about any one plant situation. He will also find that any injustice or repression will only saddle him in the end with an external fight for which he has furnished the ammunition and greater intelligence for securing his defeat than would otherwise be available.

Preferable to Arbitration

7. What about arbitration?

Compulsory arbitration in industrial differences, the writer believes, will not serve the interests of society or of the parties at issue. Intervention by the Government in a real public emergency is another matter, but it should not become so frequent as to constitute the rule rather than the exception; for when this is the case, all means calculated to bring about a direct settlement between the disputants are weakened and are often regarded as of no ultimate importance.

The tendency to rely upon the Government and law to secure for individuals and groups by judicial or semi-judicial procedure a bigger share of this world's goods than economic considerations and their deserts would justify, has caused the public, capital, and labor alike to fight shy of the dilatory procedure of such tribunals whose ultimate decisions are apt to be out of keeping with the necessities and merits of the case, and whose machinery is cumbrous and is not adaptable to the needs of industry densely congregated in our industrial districts. A quick, intelligent decision is what the public, labor and management need and desire. Speed is of the essence of this service and it is likeliest to come where knowledge of the facts and of each other is already considerable.

The Swift plan of employee representation leaves the matter entirely open for any subsequent or separate action whenever an agreement by a two-thirds majority of the assembly is not arrived at under the plan. The parties are then free to compromise, arbitrate, separate, or fight, as they choose, but the plan as such, is not discarded; it is only dispensed with on that issue.

On Satisfying the Public

8. Can capital and labor satisfy the public and each other?

The public desires five things in industry:

1. Stability.
2. Goods and services.
3. Leadership.
4. Some control in emergencies.
5. Progress.

Capital desires the same five things in terms of:

1. Security of investment.
2. Ample production.
3. Good management.
4. Sufficient control of conditions affecting the risk.
5. Expansion.

Labor's desires, expressed in terms of "what the workman wants," rather than in the rhetoric of labor politics, are almost identical, viz.:

1. A steady job.
2. Adequate real wages.
3. A good foreman.
4. Individual and collective voice about conditions.
5. A chance to rise.

The writer believes that a large measure of the reconcilement of the three interests outlined will be attained through seeing that the worker obtains in a satisfactory measure the five things just mentioned, and that he does so through democratic processes. It is not believed that these ends are inconsistent with those of the public and of capital, for the latter at its best is just enlightened management, and its industrial engineers must answer satisfactorily this question, viz., "How are the masses of men and women, both without and with capital, to be taught to labor with their hands and brains willingly and efficiently so as to secure out of the products of their toil and thought what they feel to be, and what will be, in fact, a fair return?"

To remove the nightmare of unemployment from the workman's pillow; to carry any necessary surplus labor of an industry at that industry's expense; to pay the highest possible wages; to improve the economic machine to that end; to lead, not drive men by adequately trained and sympathetic executives who will command their respect and esteem; to provide for self-expression on all the worker's interests, and to keep the way wide open for his education and advancement, are measures both just and necessary and are the basis of all Swift & Co.'s industrial relations.

Sharing in Profits and Management

9. Is the worker asking for profit-sharing and management-sharing?

We find the worker little interested as yet in profit-sharing or management-sharing or in any kind of stake in the business which involves responsibility or risk, or in any incentive which implies a long-deferred reward. Labor may come, and we hope will come, to the stage where it will go out with its accumulations and hire capital intelligently at the good wages which capital will always command in a wealthy country like the United States; that, however, is in the future and demands years of discipline and preparation, a saving margin from earnings, and considerable extension of the habit of thrift. Revolution and confiscation, meanwhile, hold no blessings for the workman.

The average worker to-day is far from holding the extreme opinions often assigned to him by those who furnish the theoretical underpinning for new social views or by those who make a living out of his discontent.

What Is Ahead?

10. Where do we go from here? is the last question. It is inevitable on the lips of the forward-looking people in industry.

American capitalism at large is *not* reactionary though some capitalists are. It is honestly seeking a way out and that way is necessarily different from the course likely to be followed in other countries. Take England, for instance. There, because of social and political cleavages centuries old, all labor controversy

starts and ends to-day with a solid body of unionism functioning nationally within a small area under leaders of high intelligence and long experience. Unfortunately, English unionism is pessimistic. It is little concerned about production and deeply engaged in dividing up "all there is." It hopes for little and gets it. It aims at making men dear without making goods plentiful.

In America, however, where all hope to rise, nothing but good can come to labor—union and non-union alike—by undiscriminating home rule in each plant for all of the people in that plant and all of their affairs, preserving at the same time the inherent rights of employer and employee to take any other action they see fit if agreement is not possible.

That is employee representation at its best, and it ought to be a powerful instrument for industrial peace at the sources of trouble instead of a new bone of contention, as unionism would like to make it.

Summary

Summing up, the great bulk of human industrial effort must continue to be outside of the immediate control of the Government. Yet industry can only progress in a democracy with the consent of the governed, and it is the negative attitude about this on the part of a few prominent capitalists that retards progress in industrial relations. Capitalism holds the field beyond any doubt. It is the only system which has made good and there is no other in sight which can carry on. Though we live in a society admittedly acquisitive, one in which the economic motive is dominant, we do not claim that this motive is socially sufficient. The things that we individually strive for are increasingly those which promote the general welfare rather than mere accumulations of wealth. The public and the individual conscience is increasingly tender about the quality of the society which our economic system is producing, and being a democratic society, the justice of the distribution of the necessities and good things of life is always open to discussion, and the method of it to amendment. Yet no one who makes daily contact with the sane but strictly self-regarding attitude of the workman can consider radical reconstruction as immediately necessary or as practicable on the basis of the present meager fund of altruism. Personal selfishness can no more be assumed to-day as eliminated from the performance of any social function than physical force from the practices of government. Of that we have had recently abundant proof. The joy in personal achievement, which we would like to see greatly increased, is yet too limited to be a universal incentive. The economic urge must still be relied upon to motivate the great majority, and on the whole it has not proved a detrimental impulse in human development.

Unionism in the past has rendered invaluable services to labor in raising the status of the worker in the face of indifferent ownership. It will render more and will always be on the heels of the illiberal employer. However, as it has only reached a mere fraction—about one in eight of the 41,000,000 people gainfully employed in the United States—it is foolish to insist that in any industry unionism must rule or ruin; for like capitalism, it can only commend itself in the end by good works. Indeed, every custom in our day must have pragmatic sanction. We see many programs of what we might be if we were better than we are, but we are also learning much that is useful as to what we can be even as we are.

In closing, we desire to emphasize that, though the perfecting of the technique of industry through the scientific method is socially desirable and is under way, it will not of itself bring in a new industrial day or greatly reduce economic friction as was once predicted.

The intangibles in industrial relations are truly sensed only by those who are touched to fine issues, and happily that company is on the increase. We commend to all two motives which sum up our experience; namely, education and service. They are embodied in these words of wisdom, an old Persian proverb, "The wise man can understand the foolish because he has been foolish, but the foolish cannot understand the wise because he has never been wise," and an injunction of Dean Inge, "Don't get up from the feast of life without paying for your share of it."

American Iron and Steel Institute Annual Meeting

The annual meeting of the American Iron and Steel Institute was held Monday, May 1, President Gary presiding. The directors whose terms expired, Joseph G. Butler, Jr., E. A. S. Clarke, W. H. Donner, Willis L. King, Samuel Mather, and John A. Topping, were re-elected.

Alexander Glass, chairman Wheeling Steel Corporation, was elected treasurer, as successor to Edward Bailey, who had served for many years.

The program for the next general meeting of the institute to be held at the Hotel Commodore May 26, has been nearly completed.

The institute is now located in its new offices, 40 Rector Street, corner of West Street.

Dominion Alloy Steel Co. Plans

Following a meeting of the directors of the Dominion Alloy Steel Co., Sarnia, Ont., it was announced that the plans of the company have been enlarged and will provide for the erection of a $5,000,000 plant instead of a $3,000,000 project originally contemplated. It was also stated that the first sod of the new plant will be turned within two months.

It is announced from Alliance, Ohio, that the Chamber of Commerce of that city has concluded negotiations for the removal to Alliance of the Blake Pump & Condenser Co., maker of power pumps, from Fitchburg, Mass. The name will be changed to the Alliance Pump & Machinery Co.

COMING MEETINGS

May

The National Supply and Machinery Dealers' Association. May 8, 9 and 10. Seventeenth annual convention, Marlborough-Blenheim Hotel, Atlantic City. Secretary, T. James Fernley, 505 Arch Street, Philadelphia.

American Society of Mechanical Engineers. May 8 to 10. Spring meeting, Atlanta, Ga. Secretary, Calvin W. Rice, 29 West Thirty-ninth Street, New York.

National Association of Manufacturers. May 8, 9 and 10. Annual Convention. Waldorf-Astoria Hotel, New York. General offices, 50 Church Street, New York.

National Foreign Trade Council. May 10 to 12. Convention Hall, Philadelphia. Secretary, O. K. Davis, 1 Hanover Square, New York.

National Sheet Metal Contractors' Association. May 15 to 19. Convention and exposition, Cadle Tabernacle, Indianapolis.

National Association of Purchasing Agents. May 15 to 20. Annual convention and exposition. Exposition Park, Rochester, N. Y. Secretary, H. R. Heydon, 19 Park Place, New York.

American Iron, Steel & Heavy Hardware Association. May 23 to 25. Annual meeting, Hotel Washington, Washington. Secretary, A. H. Chamberlain, Marbridge Building, New York.

American Society for Steel Treating. May 25 and 26. Sectional meeting, Pittsburgh. Secretary, W. H. Eiseman, 4600 Prospect Avenue, Cleveland.

American Iron and Steel Institute. May 26. Spring meeting, Hotel Commodore, New York. Acting Secretary, H. H. Cook, 61 Broadway, New York.

June

American Association of Engineers. June 5, 6 and 7. Annual meeting, Salt Lake City. Secretary, C. E. Drayer, 905 State Building, Chicago.

American Foundrymen's Association. June 5 to 9. Annual meeting and exhibition. Rochester, N. Y. Secretary, C. E. Hoyt, 140 South Dearborn Street, Chicago.

American Society for Testing Materials. June 26 to 29. Annual meeting. Chalfonte-Haddon Hall, Atlantic City. Secretary, C. L. Warwick, 1315 Spruce Street, Philadelphia.

FOUNDRY CONVENTION PROGRAM

Many Additional Papers Secured for Rochester Meeting in June

The revised and practically final program of sessions at the convention of the American Foundrymen's Association, June 5 to 9, inclusive, at Exposition Park, in Rochester, N. Y., adds a number of papers to the preliminary list appearing in THE IRON AGE of April 6, and gives the particular sessions at which these and the various committee reports will be given, as follows:

Opening of Exhibits and Registration, June 5, 10 a. m.
Joint Opening Session, June 5, 2 p. m.

American Foundrymen's Association and the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers.

International Session, June 6, 9.30 a. m.

Annealing of Gray Iron, by J. F. Harper and R. S. McPherron, Allis Chalmers Mfg. Co., Milwaukee, Wis.

European versus American Molding Machine Practice, by E. Ronceray, president Societe Anonyme des Etablissements Ph. Bonvillian & E. Ronceray, Paris.

Making Typewriter Frames in a Belgian Foundry, by Joseph Leonard, president Association Technique de Fonderie de Liege; Herstal, Belgium.

Destruction and Reconstruction of French Foundries, a memoir submitted by the Association Technique de Fonderie de France.

Cupola Melting Tests with Mixtures Changing During Run, by Richard Moldenke, Watchung, N. J.

American vs. British Cast Iron, by F. J. Cook, Rudge-Littley Ltd., annual exchange paper of the Institution of British Foundrymen.

Steel Session, June 6, 2 p. m.

Side Blow Converters for Steel Foundries, by T. Levoz, Association Technique de Fonderie de France.

Tests with Cerium as a Deoxidizer and Desulphurizer in Red Brass, Cast Iron and Converter Steel, by L. W. Spring, Crane Co., Chicago.

A Study of the Change of Grain Size of Silica Sand Through the Constant Addition of Clay, by R. J. Doty, Sivyer Steel Casting Co., Milwaukee.

Accurate Control of Analyses in Acid Electric Steel Furnaces, by A. C. Jones, Electric Steel Co., Chicago.

A Managerial Study of Oxy-Acetylene Cutting and Welding in Foundries, by G. O. Carter, consulting engineer Linde Air Products Co., New York.

Non-Ferrous Session, June 6, 2 p. m.

Technical Control of McCook Field Foundry, by E. H. Dix, Jr., McCook Field, Dayton, Ohio.

Selection of Fuels and Furnaces for Melting Copper and Brass Alloys, by T. H. A. Eastick (deceased).

Porosity of Non-Ferrous Metals, by R. R. Clarke, Pittsburgh.

An Investigation of "Segregation" with a view to Preventing its Occurrence in Castings made of High-Lead Bronze, by R. E. Lee and F. B. Trace, Allegheny College, Meadville, Pa.

Brass Forgings, by C. G. Heiby, Mueller Metals Co., Port Huron, Mich.

Steel Session, June 7, 9.30 a. m.

A New Electric Furnace, by R. Sylvany, Association Technique de Fonderie de France.

Impact Tests on Steel, by F. C. Langenburg, Watertown Arsenal, Watertown, Mass.

Manufacture of Manganese Steel in the Electric Furnace, by J. Howe Hall, Taylor-Wharton Iron and Steel Co., High Bridge, N. J.

Progress in Open-Hearth Process, by Willis McKee, Arthur G. McKee & Co., Cleveland.

Report of committee on specifications for steel castings.

Non-Ferrous Session, June 7, 9.30 a. m.

Two-Part Castings Made in Three-Part Molds, by W. H. Parry, Brooklyn, N. Y.

Use of Secondary Aluminum Ingot in Foundry Practice, by W. M. Weil, National Smelting Co., Cleveland.

Aluminum and Aluminum Alloy Melting Furnaces, by R. J. Anderson, Bureau of Mines, Pittsburgh.

Melting Aluminum for Rolling into Sheets, by J. A. Lange, Western Springs, Ill.

General and Gray Iron Session, June 7, 9.30 a. m.

A Study of the Weight of Iron Castings, by J. D. Wise, University of Illinois, Urbana, Ill.

Electrically Heated Metal Patterns, by C. A. Cremer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Flask Equipment for Molding Machines, by Arnold Lenz, Saginaw Products Co., Saginaw, Mich.

Design of Geared Ladles, by A. W. Gregg, Whiting Corporation, Harvey, Ill.

Investigations Relative to Insulated Core Oven Design and Performance, by C. F. Mayer, Ohio Body & Blower Co., Cleveland.

Electric Cranes in Foundry Service, by A. H. McDougall, Whiting Corporation, Harvey, Ill.

Technical School Foundries, by Prof. J. D. Hoffman and R. E. Wendt, Purdue University, Lafayette, Ind.

Report of A. F. A. sub-committee on specifications for cast iron wheels.

Memorial on Corrosion of Cast Iron, by H. Y. Carson, American Cast Iron Pipe Co., Birmingham.

Report of committee on specifications for gray iron castings.

Industrial Relations Session, June 7, 2 p. m.

Report of A. F. A. committee on safety, sanitation, and fire protection.

Cycles of Depression and Their Prevention, by Ernest F. DuBrul, general manager, National Tool Builders Association, Cincinnati.

Prevention of Waste in Industry, by L. W. Wallace, executive secretary, Federated American Engineering Societies, Washington.

Time Study and Job Analysis in the Foundry, by A. J. Kramer, Deering Works, International Harvester Co., Chicago.

Eye Protection and Safe Clothing in the Foundry, by Buell W. Nutt, Safety Equipment Service Co., Cleveland.

Molding Sand Research Session, June 8, 9.30 a. m.

The Preparation of Steel Foundry Sands, by S. H. Cleland, National Engineering Co., Chicago.

Establishing a Method of Testing for Green Bonded Strength, by R. J. Doty, Sivyer Steel Casting Co., Milwaukee.

Significance of Screen Test of Molding Sand, by H. A. Schwartz, National Malleable Casting Co., Cleveland.

Reports of joint committee of American Foundrymen's Association and National Research Council on molding sand research.

Malleable Cast Iron Session, followed by General Business Session, June 9, 9.30 a. m.

The Manufacture and Properties of Refractories for Air Furnaces, by C. E. Bales, Louisville Fire Brick Works, Highland Park, Ky.

The Behavior of Fire Brick in Malleable Furnace Bungs, by H. G. Schurecht, Bureau of Mines, Columbus, Ohio.

A European View of the Malleable Problem, by T. Levoz, Association Technique de Fonderie de France.

Use of Carbon Dioxide Recorders in Controlling Combustion of Powdered Coal, by D. M. Scott, T. H. Symington Co., Rochester, N. Y.

Use of Pulverized Coal for Malleable Foundries, by E. E. Griest, Chicago Railway Equipment Co., Chicago.

When and Where the Foundry Should Use Electric Heat, by E. F. Collins, General Electric Co., Schenectady, N. Y.

Report of committee on malleable castings specifications.

The Relation of Temperature to the Form and Character of Graphite Particles in the Graphitization of White Cast Iron, by E. J. C. Fisher, Atlas Die Castiing Co., Worcester, Mass.

"Fuel Saving in Modern Gas Producers and Industrial Furnaces" was the subject of a paper read by W. B. Chapman, president Chapman Engineering Co., before the American Society of Mechanical Engineers at its last annual meeting. The author has devoted himself to the development of the modern continuous gas producer and to a study of industrial furnace problems. He recently spent the greater part of a year in Europe studying furnace practice there and secured for America the rights for the Stein balanced draft recuperative furnace. A copy of the paper mentioned can undoubtedly be had by addressing the Chapman company at Mt. Vernon, Ohio.

Sullivan, Kyle & Co., Inc., 66 Broad Street, New York, has been organized to engage in export and import with South America, Mexico and the West Indies. Edward J. Sullivan, president of the new company, has been connected with the American Trading Co. for about 30 years, the past ten years representing the company in Argentina and Uruguay. Wilbour Kyle, vice-president and treasurer of the company was connected with the American Trading Co. for about 20 years and has been associated with Dutilh-Smith McMillan & Co., New York, for about 10 years.

REGENERATIVE CAR FURNACE

Preheating Chamber Uses Heat Radiated from Cooling Annealed Material

BY ALAN D. DAUCH*

IN November, 1920, a large regenerative car-type electric furnace for annealing wire was put into operation at the plant of the Fowler & Union Horse Nail Co., Buffalo. This equipment consists essentially of three furnace chambers, each 12 ft. long, 7 ft. wide and 4 ft. high. One chamber is employed for heating, one for cooling and one for preheating. Reference to the plan shows that the heating and cooling chambers are set in tandem, with a common door between, while the preheating chamber is placed alongside the cooling chamber, with a full side opening between them to allow free interchange of heat from the hot to the cold charge.

Electric heating units are installed in the heating chamber only. They consist of heavy nickel-chromium ribbon suspended on the side walls by means of special refractory insulators. There is a total heating capacity of 180 kw., the windings being designed for direct connection to the 440 volt, 3-phase power service of the plant.

Automatic temperature control equipment consists of a standard General Electric heater panel, actuated by a Leeds & Northrup two-point control instrument. This instrument, which has a temperature scale from 200 to 2000 deg. Fahr., records both the temperature of the heating unit and the charge, and functions as a controller as well. Neither the temperature of the ribbon nor that of the charge can exceed a predetermined value.

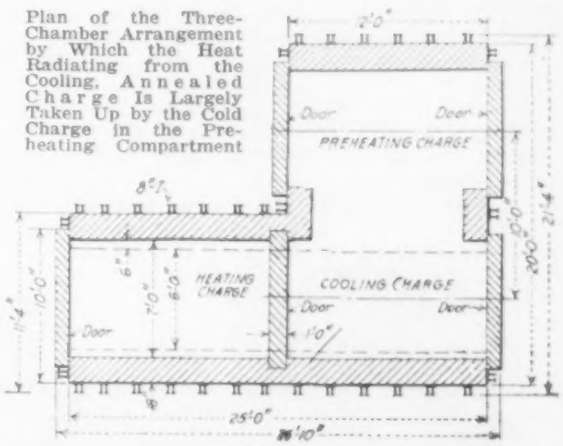
Furnace cars, built by the Easton Car & Construction Co., are 12 ft. long, 6 ft. wide and 30 in. high. Of the swivel truck type, they are heavily insulated; on all four sides of each car are sandseal troughs, so that the furnace can be sealed when in service.

The cars are moved into and out of the furnace by a special conveyor mechanism designed by the engineers of the Fowler & Union Horse Nail Co. This consists of two endless chains, parallel to each other, below the floor level, one being located beneath each car track. The chain has steel dogs spaced at car length intervals, which engage lock bar pins provided at both ends of the cars, so that either end may be engaged as required. The conveyor drive is located at the extreme end of the furnace room. Control levers for the conveyor, as well as the air valves for operating the five furnace doors, are all located on a control pulpit.

The product annealed in this equipment is ⅜-in. diameter wire, from which horse shoe nails are made. The wire is delivered to the furnace in coils weighing approximately 250 lb. each, the charge per car being about 7500 lb. The coils are held in place on the furnace cars by a light structural steel spider. The cars are loaded and unloaded by means of an electric hoist.

The charge remains in each chamber for a period of 3 hr. The heating chamber is maintained at a temperature of 1360 deg. Fahr. The complete cycle of operation is as follows:

A cold charge is first placed in the preheating chamber, where it absorbs heat from the cooling charge. After a 3-hr. period this charge is transferred to the heating chamber, where it remains another 3 hr. It is then carried into the cooling chamber, where it radiates heat to a new cold charge in the preheating chamber. The furnace thus delivers one 7500-lb. charge of annealed wire every 3 hr.



Plan of the Three-Chamber Arrangement by Which the Heat Radiating from the Cooling, Annealed Charge Is Largely Taken Up by the Cold Charge in the Preheating Compartment

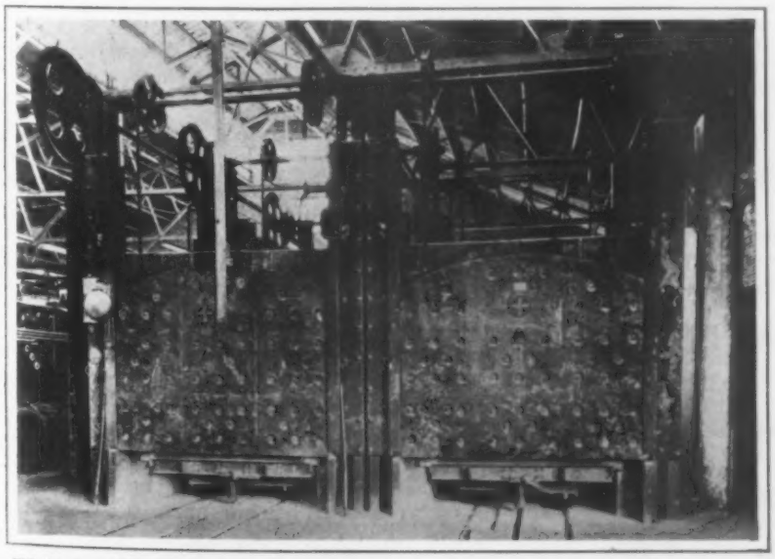
The labor cost in this installation is surprisingly low, being represented by the time of two men for a 7-min. period to operate the mechanical equipment for moving the cars and furnace doors, and also to load and unload the cars. This operation occurs once every 3 hr.

When operating 10 hr. per day, the furnace delivers a ton of annealed product with a power consumption of 185 kw.-hr. When operating on a continuous 24-hr. schedule, a decidedly lower energy consumption per ton is effected. The results obtained from heats on a 24-hr. cycle have been found not to exceed 115 kw.-hr. per ton of wire annealed.

Converting the 115 kw.-hr. per ton of wire annealed, a turbine equipment supplying power for electric furnace uses only would produce the electric energy with a coal consumption not exceeding 230 lb. A well designed and efficiently operated coal-fired annealing furnace would consume from 225 to 250 lb. of coal for annealing one ton of wire under similar conditions. It is, therefore, apparent that the fuel costs of the two types of annealing equipment would be practically the same. There is, however, a decided advantage in favor of the electrical equipment, from the standpoint of labor for operation, floor space, maintenance and quality of product.

Wire annealed in this furnace has been reported superior in quality to that previously obtained from the fuel-fired equipments. Oxidation is also less than in the case of the fuel furnaces. The annealed wire receives from 12 to 15 cold working operations without any further heating. Due to the uniformity of the anneal obtained in the electric furnace, the upkeep cost on roll and die equip-

*Engineer, George J. Hagan Co., Pittsburgh.



While One Charge Is Being Pre-Heated in the Compartment at Right, the Second Preceding Charge, in Compartment at Left, Is Giving Up Its Heat After Having Been Annealed. This "give and take," through the open door between the two compartments, conserves heat. The (electric) heating compartment is at the other end of the furnace, in line with the compartment at left

ment has been materially reduced. In a large measure the die settings for the various cold working operations have been standardized, so that it is not necessary to change adjustments to meet variations in the temper of the wire.

With the electric furnace it is assured that all the coils in a charge are annealed uniformly, whether taken from the bottom of the charge or from the top. With the previous combustion equipment it was frequently necessary to remove the charge before the bottom coils were fully annealed, in order that the coils at the top be not overheated. This necessitated that the bottom coils be again introduced into the furnace for reheating, a procedure which was unsatisfactory both from the standpoint of direct monetary loss and from that of plant operation.

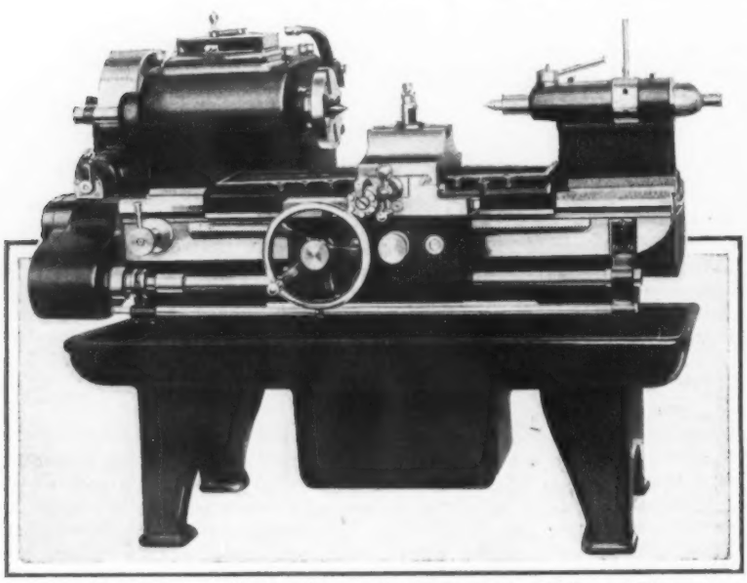
This installation was designed and installed by the George J. Hagan Co., Pittsburgh.

New 12-in. Manufacturing Lathe

A Sundstrand 12-in. heavy-duty manufacturing lathe has been placed on the market by the Rockford Tool Co., Rockford, Ill. In general design, it is the same as the company's 9-in. machine, previously offered, except for features necessary to a machine of larger range and capacity. Although primarily for specialized production it is intended also for a great variety of work, and is adaptable to thread cutting by substituting a lead screw in place of the feed rod.

The headstock is of selective-speed type, single-pulley drive equipped with a powerful friction clutch to the large driving pulley. The same movement that disengages the clutch automatically applies a brake, stopping the spindle instantly. Nine spindle speeds are obtainable.

An extension is provided at the outer end of the spindle for attaching an air cylinder, draw-in and other attachments. The main spindle taper bearings are of special bronze and are adjustable for wear by means of a single nut at the rear end of the spindle, providing instantaneous adjustment.



A Special Feature on the Carriage Is the Multiple Stop Collar. This makes a positive stop for the cross slide

A special feature on the carriage is the multiple stop collar which makes a positive stop for the cross slide when turning shafts with shoulders and different diameters. The carriage has unusually long bearing surface on the ways and is arranged with a slide block for taper attachment. It has lugs on top, drilled and tapped to permit the mounting of extra cross slides, special tool-holder blocks, etc.

The apron is of the double-walled type, constructed with a minimum number of working parts. A feed reverse box, of bevel-gear and clutch type, with steel gears and bronze shaft bearings is part of the regular equipment, as also a quick-acting tailstock. Taper attachment, draw-in attachment, and rear tool block can be furnished.

The specifications include the following dimensions: Swing over cross slide, 10 in.; distance between centers, 18; hole through spindle, 1 11/32 in.; diameter of drive pulley, 12 in.; and speed of pulley 200 r.p.m. There are 29 feeds and nine spindle speeds. The motor recommended is 3 hp. at 1200 r.p.m. The floor space occupied is 35 by 70 in. and the weight 3130 lb. net.

Opposes New Patent Legislation

WASHINGTON, May 2.—Pending patent legislation was denounced as "dangerous and destructive of the American patent system" before the Senate Patents Committee yesterday by a delegation from the American Engineering Council of the Federated American Engineering Societies. Edwin J. Prindle, New York, chairman of the council's patents committee, voiced the protest of the engineers against the passage of the Stanley and Ladd bills, saying that the poor inventor would be injured and that the American patent system would degenerate into a position of the second or third class.

Stanley bill, S-3325, provides for the granting of compulsory licenses where patents have not been worked to a reasonable extent within a reasonable time. It would unquestionably apply, it is claimed, to all United States patents, whether owned by American citizens or aliens. The Ladd bill, S-3297, provides that patents shall lapse if not worked within five years after they are granted, or two years after they have been assigned.

"The object of the bills," admitted Mr. Prindle, "is to throw German-owned American patents open to American use and prevent the Germans from manufacturing in Germany and importing here, while retaining the use of their invention here through their American patents. The international convention, to which most of the leading countries are parties, would prevent a working clause in our law which applied only to aliens. Therefore, the Stanley and Ladd bills apply to all American patents.

"Few individuals or corporations," he contined, "would buy patents with a working clause hanging over them. Those patents which become valuable and profitable only during the last two or three years of their life would almost always have lapsed before that period would have been reached, to the embitterment of their inventors or owners and to the discouragement of all who knew of the experience. Where it was necessary to patent several alternative inventions and no basic patent could be obtained to cover all the forms, each of the alternative forms would have to be worked to keep out competition."

A classified list of trade and allied associations and also of business publications in the city of New York has been prepared in pamphlet form by the Chamber of Commerce of the State of New York, 65 Liberty Street, New York. In addition there is also an appendix of governmental officers of the city, county, State and Federal Government as well as a list of the consuls and agencies of foreign governments in New York.

The plant of the Inland Malleable Iron & Steel Co., Terre Haute, Ind., has resumed operations with approximately 300 employees. The company has received contracts for various automobile parts for the Willys-Overland Co.

The Baltimore & Ohio railroad has re-established its "Youngstown Steel Special," a fast freight carrying Valley steel products to Philadelphia, New York, Baltimore and intermediate points.

Leaves from a Steel Melter's Notebook—IV

How the Problem of Blowing the Air for an Open-Hearth Steel Furnace Was Worked Out in the Earlier Days of Natural Gas

BY HENRY D. HIBBARD

THE experience herein related was had at Pittsburgh at the time when natural gas was generally used for heating and melting steel. The furnace, which was of 20 tons capacity, was of a type then quite fashionable, having a circular hearth and horizontal regenerators to heat the inflowing air, but no regenerator for the gas. The latter was blown by its own pressure into each end of the laboratory of the furnace alternately as the furnace was reversed, entering at two points, one on the front and one on the back side. Natural gas should not be highly preheated for steel melting, as it would be by passing it through a hot regenerator, because, in the first place it is such a concentrated fuel as not to need it and secondly there would be trouble from the decomposition of certain hydrocarbons it contains which are heavier than marsh gas or methane (CH_4). These are ethane (C_2H_6) and other illuminants which are the ingredients which make the gas give a luminous flame when burned. If it were all hydrogen and methane it would burn with a blue non-luminous flame. At the temperature of a hot regenerator, say about 1000 deg. C., the heavy hydrocarbons are "cracked" and carbon is set free which is deposited in part as solid carbon in the regenerators. The deposit may grow until it becomes troublesome, interfering with the operation of the furnace. At certain gas wells some of these illuminants are condensed to a liquid by cold and pressure and, among other uses, are added to gasolene to increase its volatility.

Details of Furnace Construction

Furnaces of the kind mentioned have long been obsolete, but they were cheap and easy to build and therefore in a way attractive. Guided by a blueprint which my employers had I made the drawings of the furnace, layout, and appliances, and superintended its construction. The regenerators were simply enlarged flues located under the charging platform. In them a series of brick arches with spaces above and below were built across from side to side, which served the double purpose of resisting the pressure of the outside earth and as material to absorb heat from the outgoing gases in place of the usual checkers.

In addition to the main trouble from such a construction, considered later, was, first, the discomfort in warm weather to the workmen from the excessive heat of the floor over the regenerators and, second, the inefficient heating of the air for combustion. The hot outgoing gases naturally flowed along the roof and the cold inflowing air along the floor of the regenerator, which was obviously a wrong course for efficient heating. In a regenerator of the usual type where the chimney flue joins at a much lower level than the outlet to the slag pocket, the heating of the air is more efficiently done, as may be readily understood. The furnace had but one reversing valve, that for the air, the gas being reversed by small (about 2 in). globe valves on the gas lines, the gas being shut off one end and turned on the other at each reversal of the furnace. The air-reversing valve was water-cooled and pivoted on a vertical axis. One important advantage claimed for that type of furnace was that it sat on the general floor level, requiring no raised charging platform.

A Good Start, but Trouble Followed

The furnace being built and dried out by a wood fire, bottom was made of sand in the usual manner and we charged a small heat of 15 tons. The furnace worked well and in six hours from beginning to charge, rather less than was expected, the heat was tapped in good condition in every way. A short problem in arithmetic indicated 60 tons per day as the capacity of the furnace and every one felt satisfied. But all was by no means well. Successive heats took longer and longer time, until it was more than we could do to make two heats of 50,000 lb. each per day. The rate of melting down was sluggish and the percentage of furnace loss unduly high, giving a low yield compared with that of two old-type furnaces alongside.

The charge in being unduly wasted formed a proportionate amount of oxide of iron which fluxed the sand of the bottom, cutting and scorifying it excessively, thereby calling for more time and more sand to repair and set the bottom.

Air Supply Insufficient

I was much perplexed and at a loss to account for the slowing down of the furnace after such a fine start. What is known as a plenum, that is, an outward pressure of the gases in a furnace, had not until then come under my observation; but one of my melters called my attention to the fact that no flames whatever could be seen coming out around the doors, whereas a good-working furnace should have such flame in a small degree, to indicate a slight plenum. I tried lowering the chimney damper more and more, with the result that when flames came out at the tops of the doors the combustion of the gas was poor and the flame too smoky for good melting.

There was not, then, enough air in the furnace. The truth gradually dawned on me. In an old-type furnace there was a considerable difference in height between the hearth level and that of the air entrance at the bottom of the regenerator, as much as 12 ft. or even more in a 15-ton furnace, while the new furnace had but 4 or 5 ft. The air rising through 12 ft. of hot regenerator and uptake is heated, expanded and rarefied, so that it is much lightened, losing about 75 per cent of its weight if heated to 1100 deg. C. (2012 deg. Fahr.). It therefore tends to rise, as in a chimney, being displaced by the greater pressure of the cold incoming air. It therefore will flow into the working chamber of the furnace and allow a suitable plenum to be maintained by proper adjustment of the chimney damper.

In the new furnace this relatively high column of heated air was lacking, the short column which it had not being enough to cause the heated air to flow into the hearth in sufficient volume to burn the gas properly. Because of that fact the chimney draft was naturally employed to create a "suction" in the laboratory, enough to draw in a sufficient supply of air to burn the gas. Now, if the furnace had been practically air-tight it might have worked fairly well under such conditions and actually did so when it was new and the brickwork tight. But bricks expand and contract when heated and cooled, and, more than that, silica bricks swell when heated to melting temperatures and do not lose much of their increase in volume when cooled again. Consequently, because of such expansion and swelling, the joints of the brickwork opened everywhere in the walls and roof, making a myriad of passages through which cold air flowed from the outside whenever the pressure inside the furnace was less than that outside, or, in common parlance, when there was a suction inside, as when the chimney was used to draw in the air. Also at the same time cold air was drawn in through the cracks around the furnace doors. All this cold air entering the laboratory of the furnace tended to flow along its bottom where the charge lay, cooling it, thereby slowing down the rate of melting, and oxidizing the metal of the charge unduly. This called for

more gas to keep up the heat, which again required more air to burn it, which called for stronger chimney draft to cause it to enter, which drew in more cold air through the cracks—and so the vicious circle operated.

A Fan Meets the Difficulty

Once the case was diagnosed, finding the cure was next in order. To make the air flow freely to the laboratory demanded that it be supplied to the furnace under pressure which naturally called for the employment of a fan blower. But what blower? Campbell had not then made his calculations to determine the quantity of air a steel-melting furnace required. The air uptakes at the ends of the furnace had a horizontal cross-section of about 5 sq. ft. each, which ought to have given me a clue to the size required, but it didn't. So I asked for and obtained a fan with an outlet 16 in. in diameter to run 1000 rev. per min. When started it was at once seen to be too large and its driving pulley was replaced by a larger one which cut down its speed to 400 rev. per min. Even at this speed it gave more air than was needed, but the proper amount was obtained by regulation with a slide valve. Choking a fan does not increase but lessens the power consumed in running it, as less air is moved. Probably a fan with a 12-in. diameter discharge running at 400 revolutions would have been ample.

After the fan was installed we were masters of the situation. With both gas and air under pressure and with an ample stack we could have just the plenum we desired and so far as that went wanted nothing more. The stack could be used merely to remove the products of combustion as they formed, which is the proper function of a stack.

While blowing the air into the furnace improved its working greatly it did not make it a good furnace. The circular hearth and horizontal regenerators could be done away with only by rebuilding. The flame would melt a path through the center of the circular charge, the metal in the front and rear of it melting later. Still, we made 13 heats per week of six days, which though not excellent was passable. The type of furnace has long since disappeared.

Air Volume with Natural Gas

We know now that natural gas having a calorific power of 1000 B.t.u. requires theoretically 9.73 volumes of air to burn it. Allowing an excess of 50 per cent, about 14½ cu. ft. of air should be provided for 1 cu. ft. of gas. Assuming the weight of gas burned as 15 per cent of the weight of the charge, that is of 50,000 lb., gives 7500 lb. which is at the rate of 750 lb. per hour for 10 hours. At 23 cu. ft. of gas to the pound that amounts to 17,250 cu. ft. of gas per hour. To burn this with the assumed excess requires 250,125 cu. ft. of air per hour, or about 4200 cu. ft. per min. The pressure which the air must have to flow freely into the furnace is low, perhaps not over 1 in. of water or half an ounce to the square inch, so a fan of the ventilating type might have been used. As for the novelty of the expedient, I felt safe from trouble by others. I knew that a patent was in force which covered broadly the principle of introducing air to the laboratory of an open-hearth furnace under pressure greater than that of the atmosphere; but as all such furnaces did just that, the principle was not new and therefore we could not be stopped as infringers. Friends advised me to apply for a patent for the use of a blower as described, but happily I did not.

At one of the great steel works of the country four furnaces of the type we are considering were installed at the same time I was building mine. They also gave no satisfaction, though the troubles there were aggravated by poor metallurgical practice resulting in much unmerchantable product. The furnaces were eventually replaced by others of a better type.

In those days each steel maker had for the most part to work out his problems himself. There was no one to call upon for help and advice and the literature of the art was extremely meager. One could practically never find definite information on any point that came up. Even now most of the details of steel-making have not been described and probably many of them never will be.

One valuable point taught by this experience was the importance of having the brickwork of a furnace tight, even though the maintenance of a plenum operates to minimize the trouble from openings through the furnace walls.

Warren Companies Merged

Consolidation of the Warren Tool & Forge Co., the American Block & Mfg. Co. and the General Malleable Co., all of Warren, Ohio, has been consummated and the business is being carried forward under the name of the Warren Tool & Forge Co. The plants are located on a 20-acre tract north of Warren, between the Pennsylvania and Erie railroads. To finance purchase of the two properties by the Warren Tool & Forge Co., a $500,000 bond issue has been authorized, of which $400,000 is being offered at this time.

The consolidated company is the largest manufacturer of picks, mattocks, hammers, sledges and track tools in this country. It also produces malleable unions with bronze inserted seats and light malleable castings. Its malleable foundry has a capacity of approximately 7500 tons per year, while its union capacity is 250,000 unions per month. Included among the company's customers are the largest jobbers in the United States, Canada, Europe, South America and Asia.

The same management which has been in charge of the Warren Tool & Forge Co. since its organization in 1911 is in charge of the consolidated company. The land, buildings, machinery, equipment and other fixed assets of the interest have been appraised at $882,177.61. Combined sales of the three constituents were $1,157,991.73 in 1920. Due to general business depression, sales in 1921 were about one-third of 1920 sales.

The Warren Tool & Forge Co. began business in 1911 with a total investment of $80,000. At the time of the consolidation, its assets were appraised at $694,766.79, while its net assets, over and above all liabilities, except capital stock and surplus, were $516,215.11.

A fully equipped foundry for the manufacture of light malleable castings was operated by the General Malleable Co., organized about the same time as the Warren Tool & Forge Co. The American Block & Mfg. Co. produced malleable unions. Much of the output of the consolidated interest goes to the railroads.

James D. Robertson, of Pittsburgh, is president of the company. He is also vice-president of the Pittsburgh Valve, Foundry & Construction Co., of Pittsburgh, engaged in an allied line of manufacture. M. J. Konold is vice-president and manager of sales, while George F. Konold is treasurer and general manager.

Officials state that current sales are substantially in excess of those in 1921 and indications point to active engagement of its plant capacity through the summer.

Offices of the three constitutents have been consolidated in the office building of the Warren Tool & Forge Co.

Ore Rate Recommended

In a tentative report Examiner Myron Witters, passing upon the case of the Mississippi Valley Iron Co. against the Chicago Northwestern, et al, recommends that rates on iron ore from Michigan and Wisconsin mines prescribed for traffic moving to Granite City, Ill., be also applied to that part of St. Louis known as Carondelet. The rates recommended are $3.25 per ton from Ironwood, Mich., and $2.25 from Baraboo, Wis. He also recommends the payment of reparation to the basis on these rates on shipments moving at $4.05 from Ironwood and $2.835 from Baraboo between August 26, 1920, and July 7, 1921. The suggested rates were prescribed in the case of St. Louis Coke & Chemical Co., when carriers, according to the examiners, practically confessed that rates established through the 40 per cent advance in 1920 were unreasonable and suggested rates which are now recommended for extension to the west bank of the Mississippi River.

Rebuilt Blast Furnace on Historic Site

Close Alongside Are the Remains of the Old Stone Stacks of Early Days—Reconstruction of Other Furnaces Contemplated

NO. 3 stack of the Thomas Iron Co. has been completely rebuilt. The new foundation is concrete, octagonal in plan, with foundation bands of reinforcing rods, and measures 40 ft. short diameter at the base. Eight feet of fire brick bottom blocks bring the hearth level 16 ft. above the general yard level. The new lines of the furnace give a hearth diameter of 16 ft., a bosh angle of 79 deg. 55 min. and a height of 90 ft. from hearth level to top platform. The volume of the furnace is 17,745 cu. ft., and the total brick count in the lining, 358,400 9-in. equivalents. The general arrangement of the furnace lines, top and skip bridge are illustrated.

The hearth jacket, of 1⅛-in. plate, is 9 ft. high; the tuyere jacket, of 1-in. plate, 7 ft. 5 in. high. A steel plate bosh jacket was used, cooled by water sprays, eliminating most of the bosh cooling blocks customarily used. A new bustle pipe 4 ft. 2 in. in diameter was installed. The new furnace shell is of ¾-in. plate throughout, supported on a mantel ring of 1-in. plate, reinforced with heavy angles.

Furnace Top and Upper End of Skip Hoist, Showing Revolving Distributor, Downcomers and Hoist

The furnace top is equipped with a McKee revolving stock distributor, with 5 ft. 6 in. small bell, and 11 ft. 3 in. cast steel large bell. The platform is roughly square in plan. Four baffled type downcomers were supplied, with two bleeders and explosion valves. The top platform, distributor and downcomers are also illustrated.

The upper platform for the bell operating rigs is supported on the upper end of the skip bridge. The bell cylinders are of the horizontal type, inclosed in structural frames. A 20-ton trolley was installed for handling the furnace distributor and bells. The increased height of the furnace, coupled with the fixed location of the stock bins, necessitated a very steep skip bridge. It is of the through truss type, with ¼-in. deck plates and 60-lb. A. S. C. E. rails. Skip ropes are led through the bridge to the hoist engine directly below. Skip cars are of 100 cu. ft. capacity. The new hoist engine house is of brick on a concrete foundation, spanning the hot metal running track. The engine, built by the Otis Elevator Co., has 12 x 14-in. cylinders with a 60-in. drum.

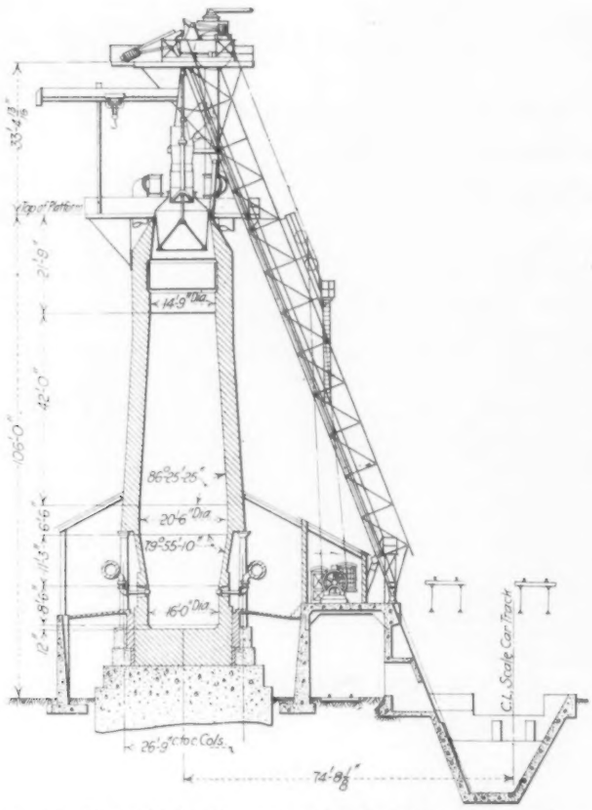
Two Pugh type 75-ton hot metal ladle cars were provided. The new Uehling pig casting machine was designed and installed in a structure suitable for housing a second machine when found necessary. This machine was made by the Pittsburgh Coal Washer Co. Additional power requirements are provided by five 514-hp. Connelly boilers designed for 160 lb. working pressure. The boilers were erected in batteries of two, provision being made for the addition of three more boilers in the future. Boilers are equipped with Kling - Weidlein aspirating burners for blast furnace gas. Three new reciprocating boiler feed pumps were installed and a feed water heater of 6000 hp. The pumping requirements of the water purification plant were met by the installation of two centrifugal motor driven pumps, each with a capacity of 1000 gal. per min. A water purification plant of sufficient capacity for the furnace plant was installed by Wm. B. Scaife & Sons Co.

The designing and rebuilding program was handled under a general contract by Arthur G. McKee & Co., Cleveland.

Historical

Even before the incorporation of the Thomas Iron Co., April 4, 1854, a site for the erection of works had been purchased, on the west bank of the Lehigh River, a short distance north of the Lehigh Crane Iron Co. plant at Catasauqua. Arrangements were made to start promptly the erection of two blast furnaces. The stacks were built of masonry, following the practice of those days, and had extensions to the tunnel heads, like Turkish minarets.

When the plant was completed and put in blast in 1855, it was the subject of much favorable comment. Percy, in his "Metallurgy," published in London in 1864, states that the works "stand pre-eminent" as illustrative of American manufacture, by reason of its "beauty, size and convenience of build, and for its historic interest." Detailed drawings and descriptions, as well as records of the furnaces, are published by Percy. Prior to this, in 1859, Prof. Lesley, secretary American Iron Association, described these furnaces as follows: "Built together and alike, 18 ft. across the



Section Through the Furnace and Skip Hoist, Showing Furnace Lines and Hoist Arrangement

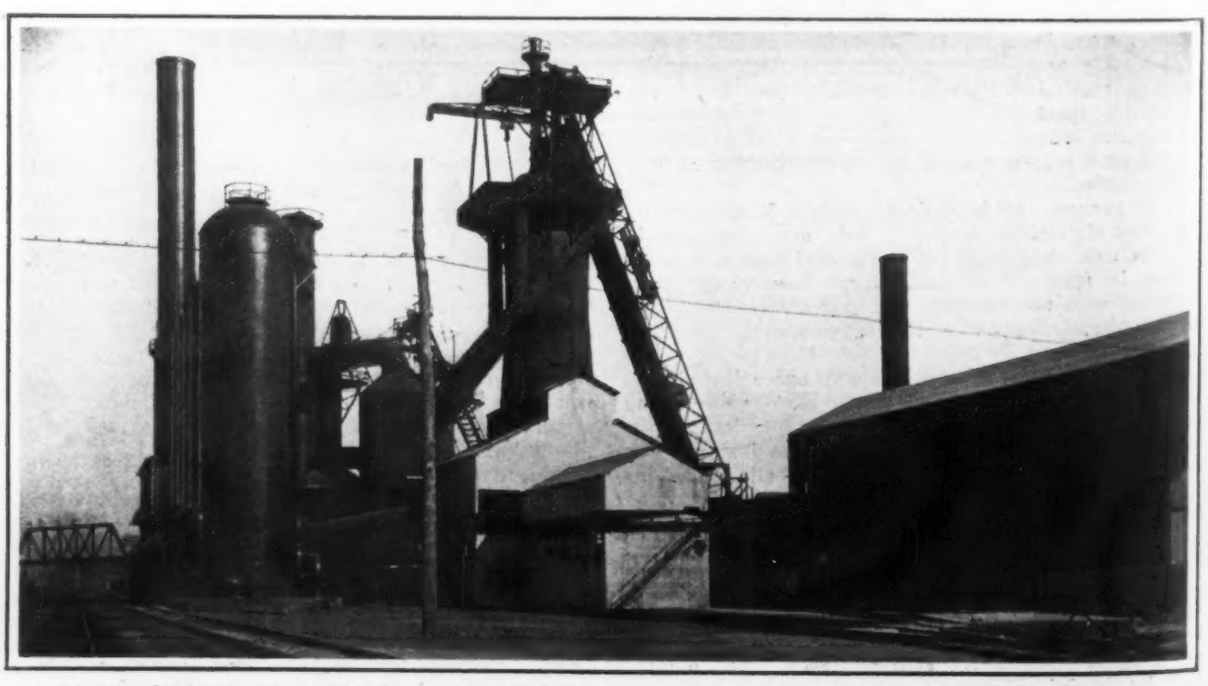
bosh and 60 ft. high, and blown by two blast cylinders in common, at the extraordinary pressure of 8½ lb. to the sq. in., these twin stacks have steadily kept in advance of all the other furnaces of the United States. In 1856 they made 17,446 tons together. In a word, here stands the demonstration that a large and well built crucible, properly stocked with good ores and properly blown with power to spare, must be a great and continual success."

Supplies of raw materials were conveniently located at Hokendauqua, especially the brown hematite ores, which abounded in the neighboring counties. Access to these ores being by teaming only and expensive, the Thomas company joined the Crane works two years later in building a railroad to the ore district. This "Catasauqua and Fogelsville" is now controlled by the Reading system. In 1882 the Ironton Railroad was purchased, giving control of the ore and limestone reached by its line.

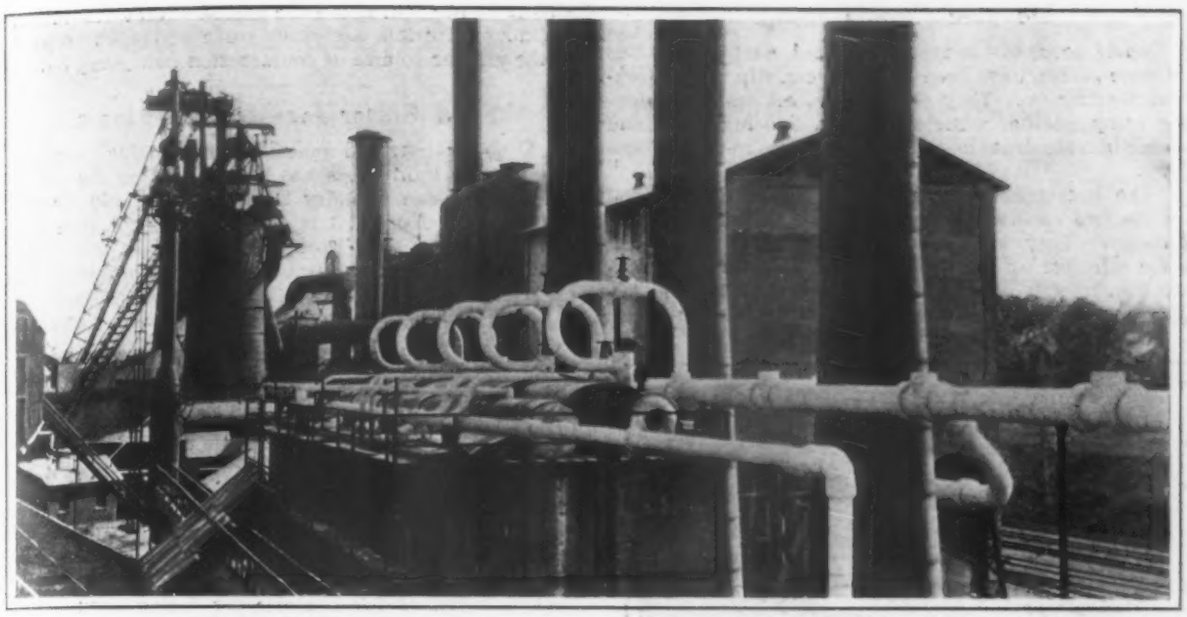
Demand for pig iron during the Civil War prompted the erection in 1862 and 1863 of two additional stacks, of the same general construction as the original ones. In 1868 the plant of the Lock Ridge Iron Co. at Alburtis was acquired, and an additional furnace was erected at that place in 1869. With its increased production, the Thomas company had already taken a foremost place among American iron makers by the latter end of the sixties; nevertheless in 1873 and 1874 two more units were built at Hokendauqua. These were also of stone construction; just why the management did not follow the advanced engineering of the times, by using the iron shell on columns, is an open question, unless there was some idea of retaining the symmetry of the original works. In this connection, it is of interest to note that by the purchase, in 1884, of the furnaces of the Saucon Iron Co. at Hellertown, the Thomas company obtained possession of two of the earliest stacks of iron shells built in this country.

Prior to the addition of the Saucon plant, the Keystone furnace at Island Park, near Easton, was acquired. Thus, in the early eighties, the company led the United States in merchant iron output, and was outranked in Pennsylvania only by the Edgar Thomson plant and that of the Cambria Iron Works, both steel mill units. Additional production was obtained through the lease of the Lucy furnace at Glendon, about 1887, but as the unit was small, it was not long retained. By reason of the commanding position of the company, its monthly quotation letters were for many years the means of establishing the Eastern iron market.

By 1904 the number of operating furnaces had contracted to nine, but with an annual output nearly 100,000 tons greater than in 1884. This came from the rebuilding of Nos. 1 and 3 furnaces at Hokendauqua, so that this plant alone was able to produce more iron at this time than was made at all the works at the time of the maximum number of furnaces. The first stack reconstructed was No. 1, which was accomplished by the tearing out of its twin (No. 2) unit, thereby making room for a modern steel shell of the day, with fire brick stoves added in 1897. Five years later the No. 3 furnace was rebuilt in a similar manner, while the fourth old stone stack was abandoned. Fire brick stoves were used to replace the original iron type at No. 6 stack, and after many years of good work there,



New No. 3 Furnace and Cast House, with Stoves at Left and Stock House at Right. Number 1 furnace, which appears behind the telegraph pole, will be rebuilt at an early date, according to present plans



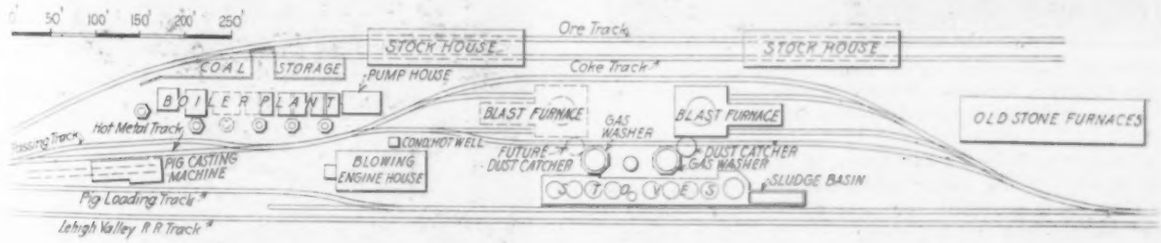
Boiler and Piping Arrangements, Showing No. 1 Furnace at Left, with the New No. 3 Furnace Barely Visible Behind No. 1

they were removed to Alburtis to augment the equipment of that plant.

Later the remaining stacks at Hokendauqua of the stone stack era were abandoned and partially dismantled, and skip hoists replaced the hand-filling arrangements of Nos. 1 and 3 furnaces. This improvement necessitated a re-arrangement of the stocking system so long in vogue. In the original layout the stock houses and casting sheds were parallel to each other, and at right angles to both the Lehigh Railroad and the river. This arrangement was satisfactory in the old days of light, close coupled equipment, but with the advent of modern ore and coke cars, the short curves gave considerable trouble. Each stock house was served by a bridge, carrying the tracks over east of the furnaces, are reached by an elevated track crossing the Lehigh Valley tracks above grade at the north end of the plant.

Changes in Personnel and Compensation

A table of considerable significance, published in the March number of the *Monthly Labor Review*, shows the changes, between 1914 and 1919, in the number and the compensation of employees in manufacturing establishments in the United States. In 1919 there were 290,111 manufacturing establishments in the country, an increase of 5.2 per cent over the 1914 figure. The



General Layout of the Plant from the Location of What Remains of the Old Stone Furnaces at the Right to the New Pig-Casting Machine at the Left. The new No. 3 furnace is the one nearest the old stone group, while No. 1, shown dotted, is to be enlarged later

those of the Lehigh Valley road, which was obviously an inadequate arrangement, with the further disadvantage of stock delivery on dead-end trestles.

The present policy of the management is to centralize operating activities at the main plant at Hokendauqua, utilizing the outlying smaller units for special iron or for caring for abnormal market demands. One of the Saucon stacks has recently been torn down, and the Keystone furnace was sold during the war period to the Northern Ore Co., but the remaining units at Hellertown and Alburtis have been put in good operating condition.

Reconstruction of the Hokendauqua plant has made good headway by the completion of the rebuilding of the No. 3 furnace, while plans have been made for enlarging eventually the No. 1 stack, thereby centering the work done around the enlarged two-furnace plant. No. 3 furnace as rebuilt is about 300 ft. north of the remains of the old stone stacks, and about 150 ft. south of No. 1. The blowing engine house, boiler plant, and pig casting machine are along the Lehigh Valley tracks north of the furnace sites, while the stoves, dust catchers and gas washers are west of the furnaces, immediately adjacent to the railroad. The stock bins,

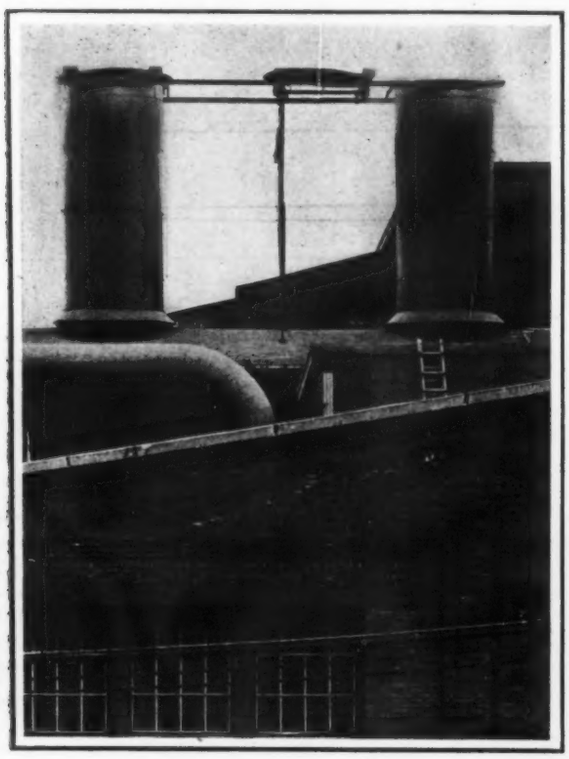
tendency toward large-scale production is shown by a comparison of this figure with the very much greater increase in the number of employees. Salaried employees in 1919 numbered 1,447,761, an increase of 50.1 per cent over 1914, and wage earners 9,098,119, an increase of 29.3 per cent in the same period. While per capita salaries increased only 50 per cent during the five-year period, per capita wages doubled in that time. These changes in numbers and per capita compensation resulted in a noticeable readjustment in the proportion of the aggregate compensation paid to the two classes of employees. In 1914 salaried employees received 24 per cent of this total, but in 1919, despite the 50 per cent increases alike in their number and their per capita earnings, they received only 21.5 per cent of the total. The corresponding percentages applying to wage earners were 76 in 1914 and 78.5 in 1919.

Wages in 1914 formed 41.3 per cent of the value added to raw material by manufacture and 42.1 per cent in 1919, so that although the aggregate amount paid out in wages in 1919 had increased 2½ times the proportionate value of the wages to the value added by manufacture remained practically the same.

Movable Cupola Hoods

Cupola hoods of the type illustrated, adaptable to one or more stacks, have been used successfully by the General Electric Co. They serve to protect operators during rainy weather while the cupola is being lined, and also eliminate trouble experienced from wet sand bottoms.

The illustration shows two of the hoods installed on the two cupolas in the company's Pittsfield, Mass., foundry. They are rectangular pieces of thin steel plate attached by bolts to two cars operating on channel iron tracks. The cars are counterweighted and are operated easily from the charging floor. The two



Movable Hoods Installed on Two Cupolas at the General Electric Co.'s Pittsfield Plant. Among other uses they eliminate trouble from wet sand bottoms

stacks are sufficiently far apart to provide ample storage space for the hoods when not functioning. Guide castings are provided for keeping the car wheels on the channel-iron tracks, these castings being bolted to the car and curve in under the tracks. Guards are furnished also to prevent the car wheels from becoming covered and frozen by ice and snow, and small end plates keep the cars from running off the track. The wheels supporting the car have a loose fit, and require little lubrication.

The channel iron trackage is from 2 by 6 in. stock, and has a truss support, the truss support uprights being of 2 by 4 in. angle-iron stock, and bolted to the tracks and foundry roof on the ends. The uprights are braced with 2 by 2¼ in. flat stock, bolted, and the truss, in whole, is firmly bolted to the two stacks.

Continued Business Improvement

Preliminary reports from the Department of Commerce show increased production, more stable prices and larger export trade. It is pointed out that fundamental conditions are much better and that there is every reason to expect business to improve steadily, although perhaps slowly. With special reference to iron and steel, there was a distinct improvement in the March export trade, while imports of iron and steel gave the largest amount for any month since January, 1921. Copper exports were the largest for any month in almost two years. Tin imports in March were the largest with one exception for the last two years. Petroleum production set a new record for March, being almost 10 per cent above the record output of January. Building materials are much more active, in response to the greater volume of construction now going on.

Sand Cutter for Medium Floors

A power operated machine for cutting sand on medium and light floors has been placed on the market by the American Foundry Equipment Co., 366 Madison Avenue, New York. It is designated as the type H.P. and is built for gray iron, malleable brass, and aluminum foundries whose floors are cramped or sand heaps too small for the company's heavier types of machines.

The machine is shown in the illustration. Ten steel shovels (blades) arranged in a cylinder, revolving 150 times a minute, 50 cuts per lineal foot, slice, toss and mix the sand, forming it into a ridge or windrow at the rate of 15 ft. per min. of floor length. The time to shovel-cut a light 15 ft. floor is given as two min., one min. to get into position and one min. to cut. In two min. more the machine will "drift" or "kick" the same floor of sand back against the wall or molding machine. According to the size of the foundry one machine, it is said, will replace from one to twelve laborers.

It is intended for use also for facing sand and is said to have been successfully employed in mixing batches of core sand and oil.

The frame of the machine is of seamless steel tubing. Front wheels are of the caster type mounted in inclined forks. The machine steers easily, without the aid of mechanism, by hand on the frame, like a push-cart, and can make short turns. The wheels have an automatic spring vertical play to compensate for unevenness in the floor without affecting the drive-wheel action.

The drive wheels are of the tractor type, driven by motor through a differential shaft with pinion at each

Power Operated Sand Cutting and Mixing Machine

end engaging with a ring gear on each tractor wheel. The cutting cylinder, shield, motor and transmission are carried upon an approximately balanced frame, which by tilting backward lowers the cutting cylinder into the sand and vice versa. Raising and lowering is by hand wheel at the front, acting through a threaded connecting rod. A safety sleeve permits instant hoisting of the cylinder independently of the hand wheel.

There are two motors, one of which is 2 hp. mounted upon the tilting frame, for driving the cutting blades. The other is a variable speed reversible fractional hp. motor for machine travel. Power is brought through a flexible cable which plugs into receptacles, located at convenient points in the foundry.

Lubrication is by high pressure forced feed system. The travel speeds are 45 ft. per min. high, and 15 ft. per min. low. The clearance between wheels is 55 in., above the floor, 22 in. The length of the cutting cylinder is 44 in. The length of the machine is 91 in., the width 63 in. and the weight, approximately 1500 lb.

Cast Iron from the Electric Furnace*

Some Historical Data—Cold Charges Versus Duplexing —Advantages Over the Cupola as a Refiner and Superheater

SINCE up to this writing all that has been published concerning electric furnace cast iron has emanated from scarcely more than one or two sources, the sketching of its history is handicapped by a paucity of those materials that are most necessary to the annalist who could cover fully and fairly his field. By electric furnace cast iron we refer in the present paper only to iron prepared in an electric furnace in a foundry for strictly casting purposes, and not to electrically produced pig iron from the ore nor to so-called synthetic pig iron prepared from steel turnings and similar scrap.

History of the Process

The literature is quickly reviewed. In England, W. H. Hatfield in his sterling book, "Cast Iron in the Light of Recent Research," hails the electric furnace as the foundry furnace *par excellence*, and "looks forward to the development of this type of furnace." This is in the second edition published in 1918, and evidently the electric furnace had not been used for cast iron in England up to that date. J. R. Hyde, of Sheffield, has said he had put in an electric furnace about five years before, finding it "very interesting if not profitable." Evidently in England electric power costs stand in the way of the use of this type of furnace for any but very unusual iron castings. On the continent the use of the electric furnace for cast iron has been vaguely rumored, but probably this has been based largely upon the development during the war of the electric furnace process for making low-phosphorus pig iron from steel turnings.

In this country the electric furnace has been used much more extensively for cast iron, although the literature still is very meager. The first extended account of the use of the electric furnace for cast iron was in a paper read by the writer before this society in April, 1919,[1] which was followed by several other papers touching upon various phases of the cupola-electric-furnace tandem or duplexing process described in the original paper.[2]

F. H. Bell, also writing in 1919[3] described a furnace melting four 625-lb. heats in a 10-hr. day, predicted the successful competition of even the cold-charge process with the cupola on account of the ease of handling special mixtures and the high quality of the product.

A Bureau of Mines bulletin issued in 1914[4] covering the whole field of metallurgical electric furnaces makes no mention of cast iron, indicating the electric furnace had not yet been there applied.

Moldenke in his admirable book[5] published in 1917 foresees the advent of the electric furnace in the iron foundry for the primary purpose of enabling the iron foundry to supply steel castings, and incidentally to run cast iron for high-quality work. He concludes his prophetic comment with the words, "It is quite possible that the not far distant future may see something practical developed of benefit to the foundryman." It is interesting to know that as he was writing, the prediction concerning the electric furnace was beginning to near realization in a plant at Cincinnati, Ohio. However, it is evident that prior to 1917 the electric furnace had not been used for cast iron to the knowledge of the well informed authority just quoted. In February, 1921, he presented a keen and comprehensive paper upon the subject before the American Institute of Mining and Metallurgical Engineers[6] indicating that the electric furnace had by that time won a place for itself in the iron foundry.

The first use of the electric furnace for gray cast iron in every day production, and not in sporadic experimental heats, seems to have been in the iron foundry of the Lunkenheimer Co., Cincinnati, in the summer of 1917. Beginning with cold charge heats the process soon underwent a logical change into the duplexing process, wherein the cupola was utilized for the otherwise costly melting period of the cycle. The first few months the furnace, a Heroult with basic hearth, was confined to melting cold charges of special low-phosphorus iron, desulphurizing, reducing the carbon by dilution with steel, adjusting silicon to suit the size and nature of the castings, and finally casting into parts for which semi-steel originally had been used.

This product perhaps came as near being the consummate semi-steel as is possible. This relatively expensive process soon developed into the tandem process and now is used only on rare occasions when small heats of special iron are desired. It is the writer's understanding that several foundries are using the cold-charge method regularly where tonnage is too small to justify a cupola, and close control of an exceptional grade of iron is required. Under such combination of circumstances there seems to exist a limited economical field for the complete cycle of melting, refining and superheating in the electric furnace.

Use of Cold Charges

Several of these "cold charge" furnaces are operating with acid hearth, which means leaving from the cycle the element of refining except in a sense that is mild in comparison with the rigorous basic process. Properly conducted this acid process consists of melting and superheating under conditions that at least are non-oxidizing as far as furnace atmosphere concerns. The length of stay in the furnace after being melted may become a period of purification. Especially will high sulphur aided by manganese automatically reduce in this way to a measurable degree.

The cold-charge process for cast iron probably never will acquire more than a scattered application, and the greatest possibilities seems to lie with the duplexing process. Since this process apportions refining to the electric furnace the most logical hearth for the electric furnace is the most potently refining one, or the basic hearth.

"What are the conditions in the average iron foundry of to-day that make feasible the addition of an electric furnace to the equipment?" This is a common question. The influencing factors are:

The limitations of the cupola,

The cost of available raw materials, and

A shifting of the basis of competition in a certain volume of the gray-iron castings business from price per pound to quality per piece.

Any one of these may carry enough weight to swing the balances in favor of the electric furnace in some cases while in others—by far the great majority—the

*Abstract of a paper, "Cast Iron as Produced in the Electric Furnace and Some of Its Problems," presented at the forty-first general meeting of the American Electrochemical Society at Baltimore, Md., April 27 to 29. The author, George K. Elliott, is chief metallurgist the Lunkenheimer Co., Cincinnati, Ohio.

[1] "Improving the Quality of Gray Iron by the Electric Furnace," G. K. Elliott; *Transactions* of the American Electrochemical Society 1919, 35, 175.

[2] "The Electric Furnace as an Adjunct to the Cupola," G. K. Elliott; *Transactions* of the American Foundrymen's Association, 28, 352. "A Note on the Electric Furnace and the Problem of Sulphur in Cast Iron," G. K. Elliott; *Transactions* of the American Foundrymen's Association (1920).

[3] *Canadian Machinery*, 21, 7.

[4] Bulletin 77, "The Electric Furnace in Metallurgical Work."

[5] "Principles of Iron Founding," Richard Moldenke (1917).

[6] "Electric Furnaces in the Iron Foundry," Richard Moldenke; THE IRON AGE, Feb. 17, 1921, 437.

united three cannot budge the foundry policy from its present established position.

Refining and Superheating

Just as the inability to refine and superheat are outstanding weaknesses of the cupola, so is the corresponding ability to do them the great advantage of the electric furnace, especially the furnace with basic bottom. Such furnace is the pre-eminent refining furnace for iron and steel. Handling cast iron, it is capable of delivering without too great attention metal superheated to any degree, reduced in sulphur as required, deoxidized, and with carbon, silicon and manganese adjusted to the desired standards. Phosphorus alone cannot be altered in cast iron by the electric furnace except by impracticable methods.

The electric furnace is at its best when coupled with a chemical laboratory in an intimate manner. By sampling the molten iron as soon as transferred from the cupola the laboratory can determine as many elements as desired, and the proper additions can be made before the metal is ready to pour, making possible the closest regulation of the composition.

Maintaining fixed rates of machining and high production cannot be divorced from a parallel preserving the fixed proper grade of iron in the castings. In order to keep uniformly a certain machinability, iron must not vary in composition over too wide a range, especially in silicon and carbon, and at times manganese. Not a few modern factories have installed ultra-modern castings-finishing methods without first co-ordinating in the proper way their metallurgical and mechanical operations. In such cases the results are liable to be either a sad falling down in production from what was so elaborately planned, or a sacrifice of highly desirable physical properties in the product in order to attain and preserve production. Planning production without first establishing the best grade of iron for the product has led to more than one manufacturing debacle. The combination of laboratory and electric furnace can be made to work nicely in solving problems of this order.

Desulphurization

The most striking reaction taking place in the basic electric furnace is desulphurization; also it may become its most valuable. There is no gainsaying that there is a tendency towards higher sulphur in the world's scrap pile. The basic-hearth electric furnace seems created almost for this crisis. Elimination of sulphur by its means is one of the readiest of metallurgical operations. Cast iron of 0.18 per cent can be reduced to under 0.07 per cent in about 30 min., meaning the changing of relatively bad iron into good. Geographical considerations are strong here, and the foundry located in a region remote from the sources of good pig iron, and therefore having to rely upon the scrap pile in the neighborhood, may be in a logical position to consider seriously the basic-hearth electric furnace.

If an answer to the sulphur problem ever is found, it probably will be many-fold with different limits of sulphur for different kinds of castings. The writer has first-hand knowledge of one class of large castings that invariably are "dirty," to quote the foundryman, at an important machined point whenever sulphur reaches 0.10 per cent or over. Empirically in this one case the answer has been found; generally we can only surmise how far we dare go with sulphur.

To the writer it seems that the sulphur question is involved in the greater one of general refinement, and it is probable that iron high in sulphur also is endowed plenteously with other impurities some of which may be almost entirely unknown. Examples are oxygen in various combinations, nitrogen as nitride, and perhaps others even less familiar. The fact that an iron is desulphurized is evidence that it has passed through a strong refining treatment, and the possibility that some of the benefits attributed to low sulphur in reality may be the result of the removal of one or more other impurities along with it, has to be recognized. Desulphurization of iron means one of the most drastic cleansings known to metallurgy and consequently low sulphur is becoming a hall-mark of refinement.

Deoxidation we have seen is a necessary concomitant of desulphurization, and cast iron coming from this process should be fairly free from oxides. This introduces one of the moot questions of cast iron. By some reputable authorities it is stoutly maintained that molten cast iron contains too much carbon, silicon and manganese to be able to carry iron oxide at the same time. Others declare it is entirely possible, and that its presence has certain tangible effects. As to the nature of the effects again there is a division of opinion. One group claims they are good while another takes the opposite view, roundly condemning oxidized or "oxygenated" iron.

The writer inclines to the belief that oxygen often persists in cast iron, in spite of the presence of oxidizable elements that should remove it, and also that its presence is undesirable. It seems to him that the persistence of oxygen as iron oxide in molten iron is as reasonably expected as is the well known persistence of determinable amounts of sulphur and phosphorus in steel heats that have been put through the most rigorous and theoretically impeccable treatments for their removal. It is readily explained by the law of mass action, which enables the iron to hold to the last traces of these impurities.

That the influence of oxygen on the whole is bad, is borne out by many experiences with the product of badly acting or carelessly operated cupolas. One other point against iron oxide is its reaction with carbon which is known to produce unsoundness in steel through the resultant gas, and there is reason to hold that this can happen also with cast iron. The time spent in the electric furnace during duplexing gives ample opportunity for this reaction to complete itself. This may be one of the substantial benefits of the process.

The oxygen question of cast iron is bound to remain unsettled as far as universal conviction is concerned, until analytical chemistry rises to the occasion. At present there is no generally accepted adequate method for determining all the oxygen in iron or steel. The Ledebur method is practiced here and there, but admittedly has serious limitations, it being claimed that it reaches at best only 75 per cent of the ferrous oxide that may be present, while it misses entirely the oxides of manganese, silicon and titanium. Few contributions to metallurgy could at present be greater than a complete set of accurate practicable methods for determining oxygen and oxides in the various metals and alloys.

Fluidity of the Iron

The advantages of superheating can all be summed up in the one word "fluidity." The electric furnace gives fluidity to irons not commonly considered fluid, a conspicuous example of which is low-phosphorus iron. This class of irons generally is preeminently strong, but unsuited for castings needing fluidity. Superheating in the electric furnace can make many of these irons eligible for the thinnest of sections.

Fluidity is a strong assurance of solid castings through freedom from blow holes, shrink holes, slag inclusions, and the like. Superheated metal increases the effectiveness of risers by lengthening the period of fluidity which is their only period of activity as feeders, and thereby obviates to a large degree that internal shrinkage that comes from fluid contraction of the metal. Abetted by super-hot metal the efficiency of the ordinary riser becomes surprising.

To conclude, it may be that the electric furnace never will acquire the widespread use for cast iron that its most enthusiastic friends predict and desire, yet the writer does not feel that its usefulness to the art of iron founding is to be measured solely by its number of installations. If it accomplishes nothing more than to inspire a new and fruitful interest in the many problems of cast iron it may well be said to have been a generous benefactor to all branches of the art. Not only does the electric furnace open up new avenues for the production of cast iron but also new lines for thought and experiment, and who is the man to declare that this last is least in importance?

New Hendey Motor-Driven Lathe

A 1922 model, belt to spindle, motor-driven lathe, as shown in the illustration, has been brought out by the Hendey Machine Co., Torrington, Conn. In brief, the new lathe is designed to retain all the desirable features of the cone type and most of the advantages of the gear type. With half the spindle speeds through belt drive, it is said to combine flexibility, power and rigidity with poise and a thoroughly convenient and sensitive control.

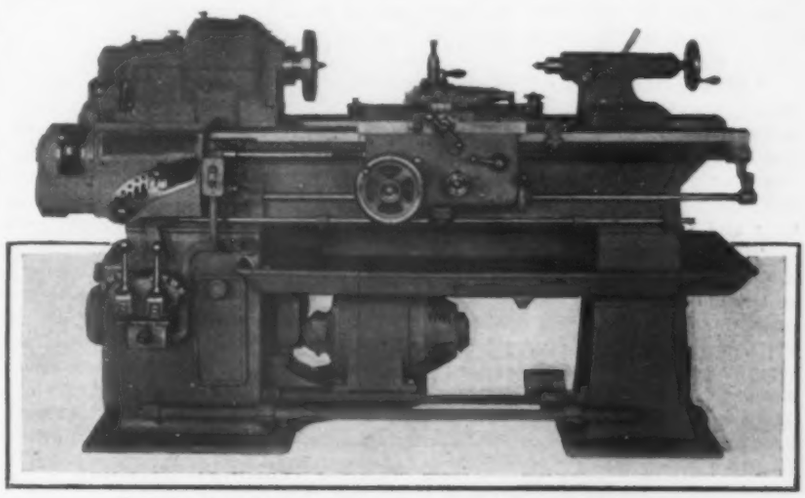
It may be noted from the illustration that in general design the lathe is compact and self contained, with all moving parts except face plate and lead screw inclosed. The units are accessible and for the most part independent. The motor is placed below the oil pan, is easily reached and removed and in this position does not obstruct light and vision. The reducing gears are placed between the motor and speed box. The speed box is in the left pedestal and with the interior of the head and the quick-change gear box, is conveniently exposed by removal of hand hole or cover plates.

The headstock is equipped with the usual Hendey taper spindle and bearings, but in addition has new features. These include the method of taking up end play of the spindle and the incorporation of a single pulley and pinion running on a sleeve, conveniently supplied with oil. The operation of the intermediate sliding feed gear is by a conveniently located eccentric lever. The back gear quill is oiled while in motion. All moving parts of the headstock, except the spindle nose, are covered.

Eighteen speeds are provided, nine direct through the belt to the spindle and nine through the customary back gears. The speed change mechanism is contained in an oil-tight box. Regulation of belt tension is instantly obtained by means of a single screw adjustment.

The carriage and compound rest are of improved design and the tailstock improved in the graduating of the spindle and method of clamping. The motor is controlled by push buttons, located as shown. By an interlocking method between the shifting levers and starting panel the speed of an alternating or direct current motor may be automatically reduced while gear shifts are made. Supplementary control of the spindle is obtained through the treadle running the full length of the bed as shown, which by foot pressure stops the spindle for examination or calipering of the work.

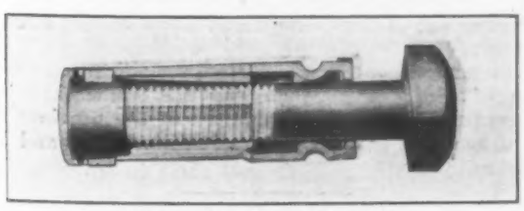
The size of the lathe shown is 14 in. It is understood that a 12 and a 16-in. size will be made also.



Half the Spindle Speeds Are Through Belt and Half Through Back Gears. Motor is controlled by push buttons. Foot pressure on the treadle stops the spindle

Improved Expansion Bolt

An expansion shield in which the shell is provided with smooth outer surfaces in cylindrical form, and with inclined elevations or ribs on the inner surfaces against which a sliding nut may act, producing expansion of the shell and making a fastening that is unyielding, has been brought out by the Isaac Church Expansion Bolt Co., East Norwalk, Conn.



Lightweight Expansion Bolt

The shield is shown in the accompanying illustration. The conical nut is forced up the acutely inclined ribs by a machine-threaded bolt of standard pitch, expanding the shell, it is said, to a rigidity beyond the tensile strength of the bolt to overcome.

It is claimed that this construction permits the use of a shield of very light weight but capable of great expansive force and holding power, retaining the advantages of the heavier shells and greatly reducing the cost. Tests made are said to show unusual resistance to vibratory strain and insufficient strength in the bolts to equal the resistance of the shield, the bolt breaking in all cases.

Will Sell Steel Warehouses

Having recently sold for the United States Government, through the U. S. Shipping Board Emergency Fleet Corporation, model war-time houses and vacant lots, located at Camden, N. J., Bristol, Pa., and various other shipbuilding districts in the East, Joseph P. Day, auctioneer, has now been ordered by the Quartermaster's Department of the U. S. A., to sell a large amount of war-time material at Governor's Island, including a number of warehouses. The sale will be held on the premises, on Wednesday, May 17, at 12 o'clock noon, at which time Mr. Day will dispose of 24 sheet steel warehouses, six sheet steel sheds, the complete sprinkler systems contained in 31 additional warehouses, and 28,000 ft. of railroad trackage.

New Type of Cropping Shear

A new type of cropping shear in two sizes has been developed by the United Engineering & Foundry Co., Pittsburgh. The floor space occupied by the smaller size is about 24 x 24 in. and by the larger size 30 x 30 in. The motor is mounted on top of the shear frame and the entire unit is self-contained, requiring no foundation bolts. Ready means are provided for lifting the shear by crane to move it to any desired location. All parts except the shear knives are entirely enclosed and there are but two sets of gears, both with cut teeth. The shears may be operated either right or left hand by simply moving the knife blades from one side to the other.

This type of shear may be mounted on the floor, or, with the length of spindles generally used on merchant mills, it may be mounted on the shoe plates between the mill stands. The cutting line of the knives will be almost in line with the face of the mill housings. This is regarded as a considerable advantage, as the bar need not be dragged back along the floor to crop the end and then up to the next pass.

The smaller of the shears weighs about 2000 lb. Bars being rolled on merchant mills will at times split on the end. Before entering the bar into the next pass this split end must be cut off, and the cropping shear is employed for this purpose.

OPPOSES PITTSBURGH BASE

Counsel for Western Consumers Addresses Mississippi Valley Association

Discussing the Pittsburgh basing question at a dinner at Kansas City, April 25, of the Mississippi Valley Association, H. G. Pickering, counsel for the Western Association of Rolled Steel Consumers, said that Pittsburgh plus was unknown prior to the organization of the United States Steel Corporation; that it first appeared on sheets in the fall of 1900, on bars in 1901, and on plates and shapes in 1904. "They say to us that there is not enough steel in the Chicago district to meet the Chicago district demand; that Pittsburgh produces 70 per cent of the steel of the country and so long as the Chicago district must obtain some of its steel from Pittsburgh the economic law of supply and demand will fix the price of steel there at the level of the price of the last unit required, namely, the Pittsburgh unit.

"As a matter of fact," he continued, "the district in which the Pittsburgh base applies does not produce more than 21 per cent of the steel of the country, and the Chicago district itself produces that much. In 30 years only three structural steel plants of importance have been built in the West—at Minneapolis, at Kansas City and at Omaha

"If Chicago were an under supplied market, and certainly for a time it must have been, how long do you suppose it would remain so, with steel bringing a premium in that market of 10 to 25 per cent over the Pittsburgh base? Not very long. And it did not long remain so. The western capacity to-day is equal to about 35 per cent of the average production of plates and sheets of the country, 38 per cent of the wire rod production, 50 per cent of the concrete bar production, 40 per cent of the structural shape production and 85 per cent of the merchant bar production. No one, I think, will claim that the supply of bars at Duluth is not far in excess of the demand in that market, or that the mills of the South cannot supply the steel consumers of the South with tonnage to spare.

Prices in West and South

"Who will say that the price of steel in the West and South has responded in any manner to the ever-increasing supply in those districts? Until a very recent date there were no mills at Duluth at all. The establishment of a great mill there, the increase of the supply from nothing to half a million tons, did not change the differential in price between Duluth and Pittsburgh by a fraction of a cent. The tremendous development of the Chicago mills has not changed the Chicago price by the value of a German mark, the enlargement of the Birmingham capacity has benefited the Southern consumer of steel to about the same extent that the soldiers' bonus policy of the country has enhanced the wealth of the veterans of the World War.

"While it is true that supply and demand have something to do with price, who, pray, will say that they have in any manner affected the price of steel paid by the Southern and Western consumer as compared with that paid by their Eastern competitors? In the early days of the industry the country had to look to Pennsylvania and Ohio points entirely for its steel, at least to a much greater extent than to-day. Then, if ever, the law of supply and demand should have decreed Pittsburgh plus, but Pittsburgh plus was as yet unborn. The supply in the West and South began to increase, and Pittsburgh plus sprang into being.

"During the years the price of steel has fluctuated all the way from 1 cent a pound to 10 cents a pound. During the same years the production, particularly in the Chicago district, has grown by leaps and bounds. What has happened to Pittsburgh plus? Has it responded to the ever-increasing supply? Far from it. From about $3 per ton in Chicago at the time it first came into vogue the plus gradually increased to $3.60. From $3.60 per ton after the completion of the greatest mill in the world at Gary, in the space of five short years, the plus increased over 100 per cent and became $7.60.

"We are not prepared to say that at any particular time or at all times the price of steel should have been the same in the West and South as in the East. It seems incredible, however, that any law or principle of economics can be brought to support the contention that during this long period of years, with the base price ever changing, with the steady increase of demand in the East and the disproportionate increase of supply in the West and South, that the price of steel at Western mills should have remained continuously higher than the price of steel at Pittsburgh by the exact figure of the freight rate between the two mills. The only plausible explanation of the phenomena is the practice of Pittsburgh plus and the uniform adherence to it by every steel mill in the country. To attribute it to the operation of economic law is too great an imposition upon one's credulity to be countenanced.

Rates to Northwest

"The Great Lakes have been highways of commerce for many years, and yet the delivered price of steel has been based upon the all-rail rate of freight from Pittsburgh to destination, and no advantage has accrued to those cities located upon the lakes by reason of the transportation facilities open to them. There are some slight variations from this. A lake and rail rate was established from Pittsburgh to certain points in the Northwest. Although for years the difference between the two rates was from 6 to 7 cents per hundred, the uniform practice of the steel mills was to allow the purchaser of steel only 5 cents per hundred in his delivered price, and even this concession applied to but few points and on a limited number of forms of steel of specified sizes. But more important still is the fact that the steel was still sold to the customer in the Northwest on the basis of the lake and rail rate from Pittsburgh. When steel moved out of Cleveland or Buffalo, the rail rate from Pittsburgh was superimposed upon the lake rate for actual transportation, through the medium of Pittsburgh plus, the Eastern mill derived practically the entire benefit of the saving effected, and the discrimination in favor of Eastern consumers still prevailed. The same thing applies to any territory where similar rates, otherwise favorable to a particular territory, exist."

Pittsburgh Basing Point Hearing

CHICAGO, Apil 29.—Building costs in Chicago are considerably raised because of the "Pittsburgh plus" charge of $7.60 per ton, asserted William Jagerman, contract and sales manager A. Bolters & Sons, steel fabricators, Chicago, at the hearing before the Federal Trade Commission which continued through the week just closed. On every 1000-ton steel job, he said, the operation of the Pittsburgh basing point adds $7,600 to the cost.

Howard Logan, assistant to the president Chicago Steel Car Co., manufacturer of tank cars, Chicago, testified that because of the business depression the Pittsburgh basing point had been abandoned in quoting certain finished steel commodities, but was retained on others. The practice, however, is gradually coming back, he asserted, and the effect will be to shut his company out of the Eastern and Southwestern markets entirely.

In general, the testimony offered during the week was of the same character as that which had been presented by preceding witnesses at the previous sessions here and at the hearings at Minneapolis and Milwaukee.

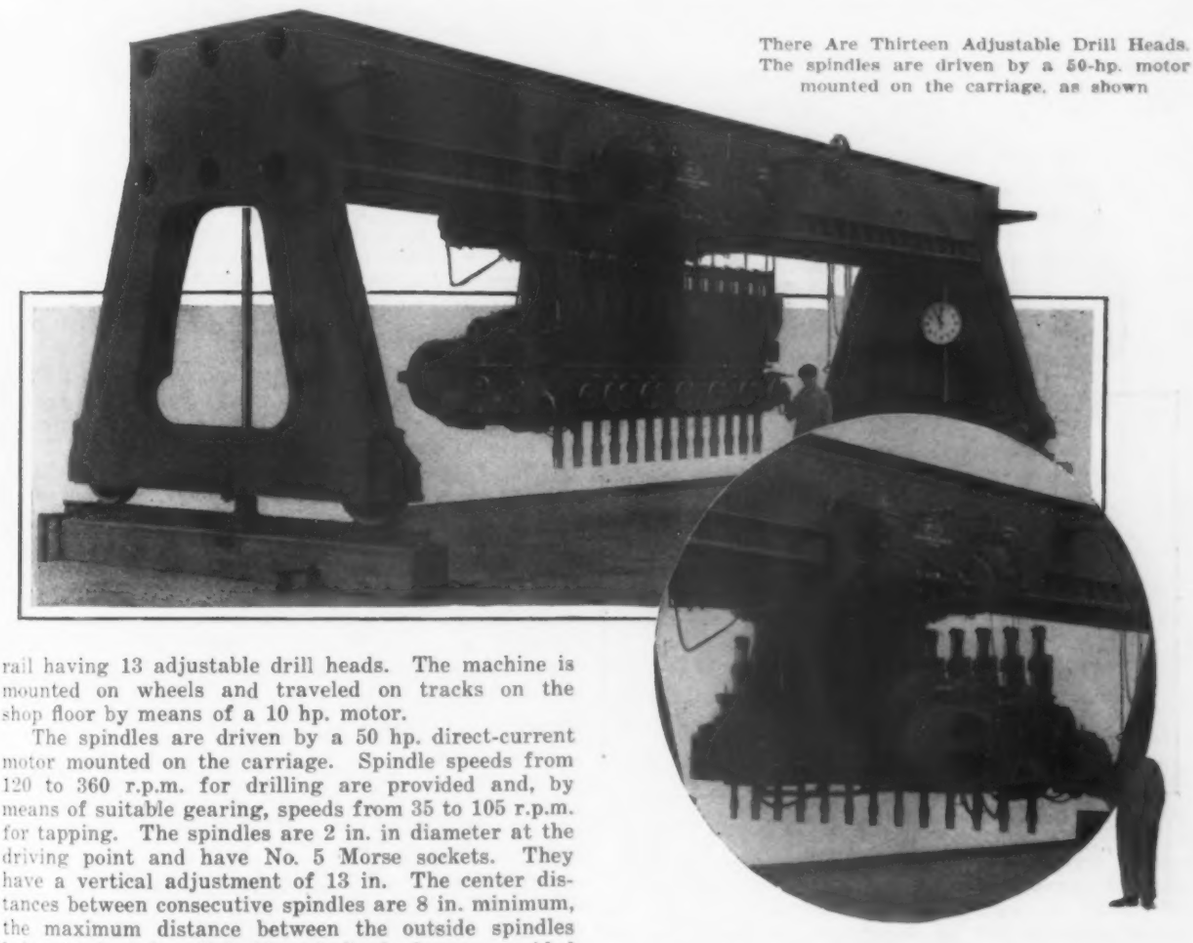
The Cleveland Purchasing Agents' Association, Cleveland, has elected the following officers for the ensuing year. President, A. G. Hopcraft, Federal Machine & Foundry Co.; vice-president, G. D. Leopold, Austin Co.; secretary, W. L. Bosley, Peck-Stowe & Wilcox Co.; treasurer, C. R. Willson, C. O. Bartlett & Snow Co.

MULTIPLE DRILL FOR PLATES

Special Machine with Traveling Carriage and Revolving Crossrail

The accompanying illustrations show a special multiple drilling machine recently built by the Niles-Bement-Pont Co., 111 Broadway, New York, for the drilling, counterboring and tapping of steel plates.

The machine is made up of two double-webbed steel plate girders supported 8 ft. 10 in. above the floor by cast-iron housings placed at 44 ft. apart. A carriage on wheels suspended as shown, is arranged to travel the length of the girders, and carries a cross-rail having 13 adjustable drill heads. The machine is mounted on wheels and traveled on tracks on the shop floor by means of a 10 hp. motor.



There Are Thirteen Adjustable Drill Heads. The spindles are driven by a 50-hp. motor mounted on the carriage, as shown

The spindles are driven by a 50 hp. direct-current motor mounted on the carriage. Spindle speeds from 120 to 360 r.p.m. for drilling are provided and, by means of suitable gearing, speeds from 35 to 105 r.p.m. for tapping. The spindles are 2 in. in diameter at the driving point and have No. 5 Morse sockets. They have a vertical adjustment of 13 in. The center distances between consecutive spindles are 8 in. minimum, the maximum distance between the outside spindles being 12 ft. 8 in. Suitable spindle feeds are provided and each spindle has an independent feed clutch to permit disengaging one or more of the drills while the others are in operation.

The cross rail in which the 13 drill heads are mounted is pivoted on the carriage which permits swiveling a full revolution, a feature intended to enable the drilling of holes along the edges of plates, in any direction. A constant-speed reversible motor is provided for revolving the cross rail on the carriage and traveling the carriage on the girders, hand movement by ratchet being also provided for the cross rail and carriage.

Graduated scales for setting the drill heads are included and also adequate clamping facilities for the carriage and cross rail. All controls are placed convenient for the operator.

Power Side Seamer Developed in 1903

The D. H. Stoll Co., Inc., Buffalo, referring to the description of the compound seam closer of the Niagara Machine & Tool Works, Buffalo, which appeared in THE IRON AGE of Feb. 23, page 534, has submitted the following in relation to the original development of machines of the type described.

In 1903 manufacturers of calcium carbide were endeavoring to obtain a suitable metal container in which to pack and ship their product. Although an absolutely water-tight package was not demanded, yet one as near atmospheric tight as possible was desired. Daniel H. Stoll, president D. H. Stoll Co., Inc., Buffalo, was at that time superintendent of the West Mfg. Co., Buffalo, and was called into consultation with the engineers of what is now one of the largest chemical manufacturing companies in this country for the purpose of developing a solderless container. This resulted in containers incorporating the Stoll box seam and in the developing and producing of the power side seaming machine.

The formations of the seam are power press operations in dies of proper construction. However, the power side seaming machine is the most satisfactory method yet devised to close the seam, although attachments have been produced to operate in power presses for this work but with more or less unsatisfactory results.

The West Mfg. Co. continued making power side seamers until late in 1904. Since that time, until very recently, the D. H. Stoll Co., Inc., has been the sole manufacturer and it estimates that approximately 15,000,000 drums are produced per year on Stoll side seamers.

Proposed New Steel Plant in South Africa

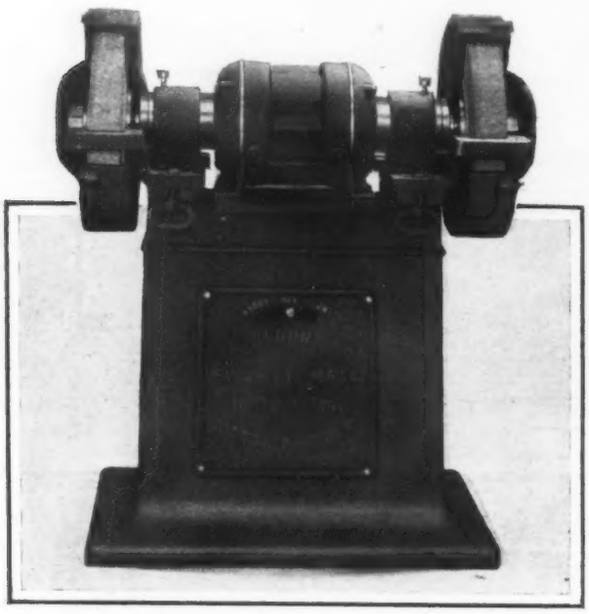
Consul General Winslow, Cape Town, reports that there are important deposits of first-class iron ore and an abundance of coal in South Africa within reasonable distance of each other that might make it profitable for at least one good steel plant. Some capitalists in England and South Africa have sent a mining engineer to thoroughly investigate the conditions. He is just returning to England, and states that his investigations have been eminently successful. Deposits of high-grade ore have been proved of sufficient quantity to carry on the industry for 50 or 60 years, while other sources are expected to be developed practically without limit. It is proposed not only to manufacture iron and steel, but also to recover tar, sulphate of ammonia, benzol and other by-products of coke.

Heavy-Duty Motor-Driven Grinder

A 5-hp. heavy-duty machine for wheels 18 by 3 by 1½ in. or 16 by 3 by 1½ in. has been added by the J. G. Blount Co., Everett, Mass., to its line of alternating current ball-bearing motor grinders.

The machine is shown in the illustration. SKF bearings are used throughout. The spindle is of 45-point carbon steel and the end shields are of cast iron, turned with recess, and bolted directly to motor frame. They are further secured in position by additional supports, clamping around the end shield hub and then bolting to either side of head casting. The end shield flanges are turned and threaded into the ends of the shields. Flanges are machined all over and recessed on the inside. The equipment includes wheel guards of either plain or exhaust type, which are adjustable. Removable covers inclose the side of the wheels, flanges, nuts, etc., for safety protection.

The starting switch is the Westinghouse No. 815 safety type, mounted within the column on a separate panel, and conveniently removable from the rear of the machine without disconnecting the switch. The



Alternating-Current Heavy-Duty Ball-Bearing Motor Grinder

switch serves to protect both operator and equipment against unexpected restarting and accidental starting of motor. It cannot be held closed on overload. The motor provided is 5 hp. for 220 or 440 volts, 60 cycle, 2 or 3 phase, or 550 volts, 60 cycle, 3 phase.

The weight of the machine is approximately 1200 lb.

Rate Decision Unfavorable to France

WASHINGTON, May 2.—The Republic of France, which has filed a great number of complaints with the Interstate Commerce Commission against railroad rates charged on shipments of war steel from American plants for export to France lost in a decision handed down last week. The commission held that the rate of 32.5c. per 100 lb. charged on 59 carloads of round steel billets, forged and ready for fabrication into shells, from Hammond, Ind., to New York, between Nov. 6 and Dec. 10, 1917, was not unreasonable. It was alleged that the shipments were round billets, rough rolled, and not smooth or surface finished. On that description they were assessed a rate of $5.30 per gross ton. Bills for undercharges were rendered at 32.5c. per 100 lb. applicable on all articles of iron or steel, not otherwise specifically provided for, when shipped in the rough, or not advanced in the stage of manufacture, beyond the casting, forging, or stamping process.

Commissioner Lewis, who wrote the opinion, pointed out that the billets had been forged and therefore were not entitled to the lower rating which was the sixth class but properly fell into the category of articles taking a rate between fifth and sixth class, sixth being applied only to the crudest forms of iron and steel articles and fifth to approaching or having wholly arrived at the finished stage.

The contracts made by the French Republic called for "steel billets for shells, forged." The commissioner said the lower rate was erroneously imposed in the first instance because obviously the articles shipped had been forged and should have been shipped on the rate applicable to forgings.

Purchasing Agency Not Fully Used

WASHINGTON, May 2.—Disappointment was expressed by President Bird M. Robinson, of the American Short Line Railroad Association in his annual report at a meeting of the association here last week that only a comparatively limited number of members have taken advantage of the opportunities afforded through the consolidated purchasing agency of the organization, which was established and began business about June 1, 1921. Mr. Robinson pointed out that the agency, when established, proceeded in the most intelligent way to make contracts and otherwise provided for the purchase of many of the articles used by practically all of the members of the association, at substantially reduced prices. Despite this, however, only a relatively small number of members have affiliated themselves with the agency itself, though deriving benefits from its activities.

Mr. Robinson said that the agency adopted the plan of sending to members full information as to prices obtained and that the executives have been astonished at some of the developments.

"It has been demonstrated that the purchasing agents of many of our members have taken advantage of the lower prices thus made possible, by using them to induce the concerns with which they had formerly been dealing, to meet such lower prices, thereby ignoring the agency that had made such reduction possible," said Mr. Robinson.

Puddlers' Wages Reduced

The average price on shipments of bar iron by mid-Western mills affiliated with the Western Bar Iron Association for the 60-day period ending April 20, was 1.50c. per lb., according to bimonthly examination of sales sheets conducted April 26 at Youngstown, Ohio. At the settlement two months previously the average was disclosed as 1.60c.

Reduction of two points in the card rate produces a cut in the boiling rate for the May-June period to $7.63 per ton, from $8.03, paid in March-April. This amounts to 4.9 per cent., while finishing hands are reduced about 4 per cent. Under the new rate they will be paid 24½ per cent above base, while puddlers will be paid a rate 38.8 per cent above base.

This is the lowest rate since the decline started. Peak boiling rate during the war was $18.76 per ton, based on an average selling price of 3.55c. per lb. The base rate for puddling is $5.50 per ton.

Shipments for the period were approximately 25 per cent greater than during the previous 60 days.

The examination was conducted by James H. Nutt, secretary of the employers' association, and M. F. Tighe, of Pittsburgh, president of the Amalgamated Association of Iron, Steel and Tin Workers.

The firm of William H. Olthoff, Amsterdam, has been liquidated and its agencies have been taken over by the N. V. Olthoff's Handelmaatschappij. The head offices of the company will be at The Hague, Alexanderstraat No. 5. William H. Olthoff has been appointed managing director. He was for many years in the service of the United States Steel Products Co., and for the last five years was the general manager of the Batavia office of that company.

The Debevoise-Anderson Co., New York, has moved from 56 Liberty Street to Engineers' Building, 114 Liberty Street.

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ESTABLISHED 1855

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Sporadic Labor Shortage

While improvement in general business conditions in the past two months has not been at any such rate as the improvement in iron and steel, indices commonly looked to show that on the whole progress has been made in the right direction. Steel was the last industry to be hit in 1920. Meanwhile other industries have had their ups and downs; but in steel, barring the slight dip last December and January, the curve of production has had an upward trend since July of last year, with a particularly steep ascent in March and April.

Favorable as the steel outlook is to-day, with the active capacity slightly over 70 per cent of the total, it seems early to talk of labor shortage or any approach to it. Yet in the Chicago district, as noted in THE IRON AGE last week, the steel companies have had some difficulty in securing labor for some classes of work. The same condition has been reported here and there in connection with foundry operations in the Middle West, the supply of molders not being sufficient for the expanding operations of several makers of castings. It need hardly be said that these cases of labor shortage are sporadic. They are the natural consequence of the scattering of workers from points at which the depression was most pronounced.

A considerable number of foreign-born workingmen returned home, in spite of the distressing conditions in Europe. There has been also a great migration of labor from one point to another in the United States in the past 18 months. The wonder is that any industrial community, whatever the manufacturing line, has been able to absorb labor from any other district. But the fact is that construction work, largely of a public character, has been a very considerable factor in the improvement of the past nine months. There was a great scattering from Detroit in 1920 and it continued for some months in 1921. The revival in the automobile industry has called back many of these men, but it has taken time to get them back. Similarly readjustments have been going on in various sections and the process of redistribution is likely to continue.

Turning back to the summer of 1920, the records show the reverse of the condition that has caused comment lately. At that time there was the first discussion following the boom concerning a labor surplus which was plainly in evidence in certain communities. In the rubber tire industry thousands of men had been laid off; but iron and steel works were still short of labor. It was said that coal output had fallen short in part because many miners had given up mining and taken up work with better pay and less arduous labor. The supply of coke-oven labor had been much under the demand for many months. Steel works had lost laborers in the strike of 1919 and many of them had not returned. The postal service had been depleted because mail carriers had found jobs yielding more pay. There was the suggestion in the late summer of 1920 that the labor surplus then beginning to show in certain quarters might well be distributed among industries that were still needing workers; but the answer was that men who had been laid off by textile, rubber, leather and other industries were of little use at steel works, coal mines or coke ovens.

The situation in the summer of 1920 was one of a pronounced labor shortage in some industries and of an increasing surplus in others. To-day it is in general one of a decreasing labor surplus, with sporadic cases of shortage which are remedied in time by the return of men to employment they were forced to leave. That there should be any shortage whatever at this early stage of the recovery in business is as remarkable as was the extent of the failure of prophecies made six months ago that the winter would establish a new record for soup houses and bread lines in American cities.

The Changed Coke Status

A quarter century and more ago an interesting sight to one traveling up the Monongahela River was a mountain of coke at the Edgar Thomson blast furnaces, maintained for several years after the great strike of 1891 in the Connellsville coke region.

There has been no important strike in the Connellsville region since then, until the present group of strikes, which have cut down the production of the region by more than one-half. The 1891 strike was very important to the iron and steel industry, even though demand for pig iron and steel was not exceptionally heavy. Nowadays no strike in the Connellsville region can be very important to the

industry taken as a whole. Conditions have changed.

The change is not simply that Connellsville coal is the basis for a smaller proportion of the country's pig iron production than a quarter century ago, although that is the case. The essential point is that by-product coking has been largely supplanting beehive coking, making a radical change in the geographic relation between the coal mine and the coke oven. Coke made from Connellsville coal in beehive ovens has always been made at the pit mouth, as regards any considerable tonnage. The coal has never been stocked between the mine and the oven. The coal itself has been stocked only in exceptional cases.

With the by-product oven the alinement is altogether different. The ovens are located at the point of coke consumption and the coal is shipped to them. Coal does not deteriorate to the same extent as coke when it is stocked, and on account of the uncertainties of movement it is convenient to provide by-product ovens with coal storage facilities.

That is one point. Another point is that with the by-product ovens coal can be mixed. There may be two coals, neither of which used by itself would make a good coke, but which when mixed will make good coke, and by-product coke plants can be so arranged as to make mixing simple and inexpensive. A new coal can be tried out in small or large tonnage without undue expense.

With the coking facilities that existed a quarter of a century ago, when the coal supply of a coking plant was interrupted the ovens closed. With the by-product plants of to-day, if the customary supply of coal is curtailed coal is sought elsewhere. In the past month there has been much buying, by by-product oven operators, of coal they do not usually use, but which they can use. Kentucky coal, for instance, has been purchased for by-product coking at Clairton. That seems like carrying coals to Newcastle, but for years Kentucky coal has been a large factor in by-product coking. It merely has to move a somewhat greater distance in this case. In 1917 Kentucky produced 4,246,254 tons of coal used in by-product coking, 284,990 tons of which was coked in the State, while 1,700,372 tons went to Ohio, 1,131,277 tons to Indiana, 634,096 tons to Illinois, and smaller quantities to other States, there to be coked. Apart from this, it may be mentioned, Kentucky used 457,172 tons of coal, in by-product coking, brought from West Virginia.

The Steel Corporation owns in Kentucky 75,810 acres of coking coal, or 31 per cent more acreage than it owns in the Connellsville region; but the corporation's annual report, from which these figures are drawn, shows that it has only one coal mining plant in Kentucky. Any inconvenience the corporation might experience in pursuing in the Connellsville region the "open shop" policy to which it so consistently adheres would accelerate developments in Kentucky, which in any event are obviously only a matter of time.

Producers and consumers have to contend with two kinds of defects or "dirt" in steel—chemical and mechanical dirt. The former results from operations in the melting or pouring departments; the latter from mechanical manipulations such as rolling and forging. Mechanical defects are often a considerable problem not only in the labor cost involved in chipping but also the space necessary to carry on the work. A Canadian inventor has perfected a device by which this extra work is largely eliminated, so that the billets when they emerge from the rolls have been mechanically scraped, doing away with much inspection and labor. As described in THE IRON AGE last week, the device has been in operation in a Canadian rolling mill since 1918. Figures as to the increased output and savings indicate a marked economy.

Prices at Home and Abroad

The United States being the only important country whose currency is on a parity with gold, prices in various countries expressed in terms of the currencies of those countries cannot be made the subject of international comparisons. Since the unpegging of exchange rates early in 1919 the rate on dollar exchange has furnished a fairly close index to the gold value of the currency of any country. Before the war exchange rates furnished a very close index. That is, if it had not been known what the gold value of a franc or a pound sterling was, but the amount of gold a dollar would purchase had been known, the rate of exchange would have indicated quite accurately the amount of gold a franc or a pound sterling would purchase.

For three years past the price of dollar exchange in various countries has given a fairly close idea of the real gold value of the currency. The price index numbers compiled in various countries are, of course, based simply on the currency values of commodities, but by using the price of dollar exchange as a factor with which to reduce the expressed value to approximate gold value, it is possible to determine roughly how prices really stand. This computation has been made by the Federal Reserve Board, the showing being given in the April issue of the Federal Reserve bulletin.

Of course, the index numbers are by no means perfect. When prices of commodities vary so widely with respect to each other as they have done in recent years the weighting is important and there is no perfect weighting system. Our own index numbers vary considerably from each other, no doubt largely on this account. Even the Federal Reserve Board has an index of its own, which differs materially from that of the Bureau of Labor. However, the index numbers are worth something.

The comparison shows that when the stated commodity prices in various countries are converted to a gold basis the differences in prices between countries have not been so very great in the past three years. The computation cited has been made for the United Kingdom, Italy, France, Sweden and Germany. There has been, of course, a great decline in actual prices, on a gold basis. The Federal Reserve Board's index number for the United States stood at 218 for August, 1919, while the mean of January and February of this year is 140. In August, 1919, the United Kingdom, with 223 as the adjusted index, and Italy with 221, were practically on even terms with the United States. France was somewhat high and Sweden very high.

In 1921 France went down more than the United States, but has now come back to a level. Italy went down and did not come back so far. The United Kingdom has been slower in coming down and is still 6 or 7 per cent high relative to prices in the United States.

With the United States, France, Italy and even the United Kingdom running not very far apart, Sweden has been very high right along, except toward the middle of 1921. The curious thing is that while Sweden then came close to the United States there has been a material advance since, so that Sweden is about 15 per cent high relative to the United States.

Germany has occupied the opposite position from Sweden, prices there when corrected by the factor of dollar exchange being some 30 per cent low relative to the United States.

Comparisons of this sort are only broadly suggestive, as they deal at best only in averages, but the suggestion is that on a gold basis it is only Germany that shows prices in gold distinctly lower than those in the United States.

Progress in Electric Cast Iron

What the electric furnace can do for the cast iron industry looms larger in the light of the discussion at the electrochemists' Baltimore meeting last week. Such a symposium would have been impossible before the war and hardly successful until very recently, so rapid have been the developments.

That the electric furnace is metallurgically efficient in duplexing with the cupola was discussed by one speaker, who was practically the first to call attention to this achievement in April, 1919. The production of a high-grade iron, desulphurized, degasified and superheated, is now recognized practice when the basic electric hearth is used. That cast iron scrap or borings can be converted into good iron castings on a basic or an acid electric hearth from cold charges was also established on the testimony of producers. New experience in the recarbonization of steel scrap and its conversion into cast iron or pig iron was detailed and it was affirmed to be a commercial proposition under certain economic conditions. Iron and steel castings are possible from the same furnace, it was also shown, and there was something further on the production of electric pig iron from iron ore.

While the wide use of certain of the processes referred to hinges on cost, the greatest possibilities of the electric furnace in the iron industry are in duplexing with the cupola or in melting or refining cold charges of scrap iron. It will be in demand also for its ability to solve the sulphur problem. By no means unimportant also will be its use in the making of steel or iron castings intermittently from scrap.

Good progress has been made already in this phase of iron metallurgy. More than fifteen electric furnaces of various types have been in use in foundries in the United States and six in Canada. What was brought out at the Baltimore meeting confirmed all that has been said as to the versatility of the electric steel furnace and also suggested a wider field than has commonly been thought of for the electric furnace in non-ferrous work. American and Canadian metallurgists are evidently leading in all this activity, little having been reported of electric furnace operation in the foundries of Europe.

CORRESPONDENCE

What Is the Matter with Freight Rates?

To the Editor: Everything else has been reduced, but the Interstate Commerce Commission and the railroads are at loggerheads in regard to what is a fair measure of rates, and the manufacturers and the people at large are still paying wartime freight rates. Increases of from 100 per cent to 2100 per cent over prewar rates are still in existence. Railroad wages, fuel and all railroad materials have been reduced, but not freight rates.

The present administration has celebrated its first year of reform and retrenchment, and the railroads have had one year of overlap on wartime rates and have recovered to the extent that manufacturers and the community should now be given some consideration, but it is the old story—"*the public can pay.*" They have paid for the last five years and they must pay to the end of the chapter, or until someone calls a halt, and then the railroads will complain that they have not been fairly treated and that new regulations which the Government makes are confiscatory. Let the railroads get busy and start out with some new measure of freight rates that can be understood, and one that is fair to the railroads as well as to shippers. Their old classifications of 30 years ago are obsolete, and their old principle of "might is right" must be forgotten in the new order of affairs.

At the hearings before the Interstate Commerce Commission in 1907, the general freight agent of one great system was put on the stand as a witness in Case No. 896 and asked how freight rates were made. His reply was, "Conditions make rates," and when asked, "What conditions?" he said, "Conditions of business; conditions of haul," and the commission got no farther than that conditions were the basis of the rate structure. Then the general freight agent of the largest railroad system in the country was called to the witness stand, and in reply to the question of what basis was used to make freight rates, he came out flat-footed and said that freight rates were made on the amount the traffic would bear. He was correct in his statement, and it is probably a fact that most private business is based on these lines; however, the railroads are not private institutions, but semi-public institutions, and demand the right of eminent domain and other public benefits. They must be under control of some department of the Government, and the public should have some say in the operations; to this end the Interstate Commerce Commission was formed, and this commission is doing a great work for the railroads, the shippers and public. It is doubtful where this country would be to-day without the great Federal Bank System and the Interstate Commerce Commission, providing some regulation in both the banking and railroad interests of this country.

Many hearings have been held before the Interstate Commerce Commission for adjustments and lowering of freight rates on all material for the past 18 months, but nothing definite has been done. The railroads have been promising reductions, but their promises are yet unfulfilled. Petition after petition and intervening petitions have been filed on brick and other building materials, but as yet nothing has been done in regard to rates on building materials. All commodity rates cannot be straightened out until the fundamental principle in regard to a measure of rates is determined by the Interstate Commerce Commission, which must arrange for a new classification and decide on some basic measure of rates.

I also find that this is now being asked for by the railroad executives themselves, as the old basis of rates made by them and admitted by testimony before

the Interstate Commerce Commission, was based entirely on the amount the traffic would bear regardless of cost of haul, and in one of their basic decisions, June 24, 1907, in case No. 896, they decided that "Classification must be based upon a real distinction from a *transportation standpoint*. Aside from the difficulty in learning what use the brick were to be put to upon reaching their destination, the commission cannot regard a classification as scientific or a difference in rates as well based, which is altogether founded upon a distinction that has no transportation significance. Such a differentiation, if permitted and extended throughout the various classes of freight, would lead to almost an endless multiplication of rates, which could find no excuse save the use which might be made from the article transported."

The basis of rates made on the amount the traffic will bear, I believe, is a thing of the past, and under Government supervision railroads must treat all commodities and shippers alike as to the services rendered them. I find that the railroads themselves have found that their basis for rates is not logical or in tune with the present trend of affairs, and they must abandon their old classifications and principles in rate-making, which are now obsolete, and furnish service based on some cost of haul or other fair measure of rates. I find that the railroads themselves acknowledge this, and have asked the Interstate Commerce Commission—clause 2 in their requests—"To adopt a fixed policy of rate-making." They have a fixed policy on passenger rates and can figure their income accordingly, but with the present policy of freight rates based on the amount the traffic will bear in the minds of the various railroads themselves without regard to the shipping interests, they are entirely at sea in regard to revenue, for the shippers in different sections do not agree with the railroads as to their decision concerning what in their opinion the traffic will bear, which is a changeable proposition.

There must be some measure of rates that can be applied to the hauling of all materials and a new classification made up that would be fair to all interests from a transportation standpoint. I can understand this is a hard proposition for the Interstate Commerce Commission to decide. They have now had over one year, and some decision should be given that would straighten out this whole matter. If such a decision could be brought out soon, it would be a simple matter to adjust all rates to all sections, putting them all on the same basis for like service to different markets and simplify this whole matter. This would make a great saving for the railroads themselves, and it would save an enormous amount of money in the endless tariffs which are published and never understood by the shippers, who are obliged in some cases to employ experts who are often unable to decipher what is really meant.

The Interstate Commerce Commission has spent a considerable amount of time on the brick proposition, and a report by its Examiner Brown puts the east and west haul in zones, which plan to me looks very feasible, and if the commission has nothing better to suggest, I consider this a fair treatment of the matter, as it is based on the principles that where one district has from its logical position an advantage on freights east, it would take a like disadvantage on freights west, and the same proposition could be figured out for north and south hauls, but in no case should any district be allowed to take an advantage one way and then demand the same rate the other way, which is not fair or just to either zone or district.

In fairness to all, and to help get a new measure of rates based on some logical position in traffic—some united effort should be made by all shippers and demands made on the Interstate Commerce Commission that some decision be given on both classification and rate basis for all interests from a transportation standpoint. That would mean that they figure all new rates on a basis of cost of haul in comparison with other commodity rates for like nature, and that the Interstate Commerce Commission make some decision and adopt some fixed policy of rate-making, which I believe would straighten out our transportation troubles for the future, and any small adjustments now made in different sections only complicate the matter. What we want is the new basis or measure of brick rates that will be fair and just to all commodities.

Brick and building material rates and the free movement of this material to all markets are the starting points to the employment of labor, as building is the starting of all improvements, and there is no industry that has had less consideration in freight adjustments in the last year than this important industry.

C. B. STOWE,
President the Stowe-Fuller Co.

Cleveland, April 28, 1922.

EXPORT ACTIVITY DECLINES

Japanese Government Purchases Still Large — China Buys Copper—Chinese Blast Furnace For Sale

NEW YORK, May 1.—Although exports generally are not active, the Japanese Government purchases continue to be a fairly large item in Far Eastern business. The recent purchase of 6520 tons of 60-lb. rails by the Imperial Government Railways, through Suzuki & Co., New York, was immediately followed by inquiry for 10,800 tons of 75-lb. rails; the former were for use in and around Otaru, northern Japan; the latter, on which bids were opened May 1 in Japan, will be used near Yokohama and Kobe. The 900 tons of special length steel rails for making switches, frogs, turnouts, etc., inquired for by the Government railroads, was placed in the United States with Assano Bussan & Co., New York. April 28, the Government opened bids on 850 tons of bridge material. Report of this award has not yet been received. Private purchases in Japan are extremely small, which is probably largely caused by the attitude of banks on extending credits. Purchases of black sheets continue, but only in small tonnages. One fair-sized order for concrete bars has been booked by the Mitsubishi Shoji Kaisha, New York. It calls for about 800 tons of ⅝-in. and larger.

Yangtze Blast Furnace for Sale

Thus far the uncertainties of the political situation in China have not had any appreciable effect upon trade from these markets, probably because the trade has been extremely small at best. Although purchase of the rails and other equipment by the Peking tramways is still held up because of financing difficulties, the company has asked for quotations on additional electric equipment totaling about $200,000. During the past fortnight, Chinese purchases of copper, reported to be for minting purposes, have totaled almost 1500 tons.

Because of lack of funds and the decline in the price of pig iron, says the American Consul General in Hankow, China, the blast furnace of the Yangtze Engineering Works, opened May, 1920, has been offered for sale at $2,000,000 silver.

Equipment Purchased for Removing Brazilian Hill

The project for removing the hill at Rio de Janeiro, Brazil, for which Leonard Kennedy & Co., New York, have the contract, is well under way. Purchases of hydraulic equipment and other material, to date, total about $600,000. The hill will be washed down into the bay of Rio de Janeiro with three high pressure, 7500 gal. hydraulic units. The work will be done by 12 No. 2 Hendy hydraulic giants. Two Marion steam shovels equipped with 4-yd. buckets have been purchased for handling parts of the hill that cannot be removed hydraulically. As the buildings for the Brazilian exposition will be at the foot of this hill and operations will be under way during the exposition, it has been necessary to purchase two 3500-ft. semi-circular flumes, 40-in. in diameter, fabricated of steel plates and lined with cast iron plates, to carry the material over and under the exposition grounds. The flumes are being fabricated by the Blaw-Knox Co., Pittsburgh, and the cast iron lining plates will be cast in a foundry in Rio de Janeiro. Hydraulic work is expected to begin about June 1.

APRIL PIG IRON OUTPUT

A Gain of 3395 Tons Per Day Over March

Twenty Furnaces Blown In, Thirteen Out

Data, collected largely by telegraph, show that the country's pig iron output in April made a substantial gain over that for March, despite the coal strike. The increase would probably have been larger otherwise. The gain per day last month was 3395 t ns over March and compares with one of 7461 tons for March over February. The increase for February over January was 5151 tons.

The production of coke and anthracite pig iron for the 30 days in April amounted to 2,072,114 gross tons or 69,070 tons per day as compared with 2,035,920 tons or 65,675 tons per day, according to revised figures, for the 31 days in March. The April increase over March was 36,194 tons. The April production last year was only 1,193,041 tons.

The total number of furnaces in blast on May 1 was 162 as compared with 155 on April 1, with 138 on March 1 and with only 69 on Aug. 1, 1921, the low point of last year's slump. The capacity of the 162 furnaces in blast May 1 is estimated, rather roughly, at 72,875 tons per day as against 69,015 tons per day for the 155 furnaces in blast April 1. There were 20 furnaces blown in in April and 13 blown out or banked, a net gain of 7 furnaces. In March the net gain was 17 and in February it was 12 furnaces.

The manganese-iron alloy output of 19,209 tons in April was the largest since April, 1921. Of this total, 14,998 tons was ferromanganese.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from April, 1921, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
April, 1921	33,854	5,914	39,768
May	33,054	6,340	39,394
June	29,444	6,050	35,494
July	23,086	4,803	27,889
August	26,037	4,743	30,780
September	27,189	5,661	32,850
October	33,365	6,850	40,215
November	37,960	9,223	47,183
December	41,173	12,023	53,196
January, 1922	42,130	10,933	53,063
February	46,827	11,387	58,214
March	53,547	12,128	65,675
April	56,930	12,140	69,070

The figures for daily average production, beginning with January, 1916, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1916—Gross Tons

	1916	1917	1918	1919	1920	1921	1922
Jan.	102,746	101,643	77,799	106,525	97,264	77,945	53,063
Feb.	106,456	94,473	82,835	105,006	102,720	69,187	58,214
Mar.	107,667	104,882	103,648	99,685	108,900	51,468	65,675
Apr.	107,592	111,165	109,607	82,607	91,327	39,768	69,070
May	108,422	110,238	111,175	68,002	96,312	39,394	.....
June	107,053	109,002	110,793	70,495	101,451	35,494	.....
July	104,017	107,820	110,354	78,340	98,931	27,889	.....
Aug.	103,346	104,772	109,341	88,496	101,529	30,780	.....
Sept.	106,745	104,465	113,942	82,932	104,310	32,850	.....
Oct.	113,189	106,550	112,482	60,115	106,212	40,215	.....
Nov.	110,394	106,859	111,802	79,745	97,830	47,183	.....
Dec.	102,537	92,997	110,762	84,944	87,222	53,196	.....

Among the furnaces blown in during April were the following: Three furnaces, A, B and E, of the Bethlehem Steel Co. in the Lehigh Valley; one Worth furnace in the Schuylkill Valley; B furnace of the Bethlehem Steel Co. in the Lower Susquehanna Valley; one Edgar Thomson furnace of the Carnegie Steel Co. and one Midland furnace of the Pittsburgh Crucible Steel Co. in the Pittsburgh district; one Shenango furnace in the Shenango Valley; one D furnace of the Bethlehem Steel Co. in Maryland; the Jeannette furnace of the Brier Hill Steel Co. and No. 4 furnace of the Carnegie Steel Co. in the Mahoning Valley; one South Chicago furnace of the Illinois Steel Co. and one Iroquois furnace of the Steel & Tube Co. of America in the Chicago district, as well as No. 3 Gary furnace; E furnace of the Colorado Fuel & Iron Co. in Colorado; one North Birmingham furnace of the Sloss-Sheffield Steel & Iron Co., one furnace of the Woodward Iron Co., No. 3 Pioneer furnace in Alabama, and two Minnesota furnaces.

Among the furnaces blown out or banked during April were the following: One Lock Ridge furnace of the Thomas Iron Co. in the Lehigh Valley; two Schoenberger furnaces of the American Steel & Wire Co. and No. 1 Isabella furnace of the Carnegie Steel Co. in the Pittsburgh district; No. 3 Shenango furnace in the Shenango Valley; one Dunbar furnace in western Pennsylvania; Nos. 3 and 4 Mingo furnaces of the Carnegie Steel Co. in the Wheeling district; No. 5 Ohio furnace of the Carnegie Steel Co. and No. 2 Haselton furnace of the Republic Iron & Steel Co. in the Mahoning Valley; the Upson furnace and one River furnace in northern Ohio and the Marting furnace of the Marting Iron & Steel in southern Ohio.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for April and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	April (30 days)	March (31 days)	February (28 days)	January (31 days)
New York	131,093	124,584	105,708	110,867
New Jersey	4,815	4,199	3,947	4,642
Lehigh Valley	45,714	32,142	29,094	31,296
Schuylkill Valley	58,927	56,893	44,674	42,144
Lower Susquehanna and Lebanon Valleys	17,387	19,948	26,074	28,227
Pittsburgh district	473,584	479,433	388,698	382,407
Shenango Valley	63,940	59,901	52,402	54,234
Western Penna.	106,430	98,502	61,459	45,511
Maryland, Virginia and Kentucky	26,463	24,172	22,222	22,858
Wheeling district	54,450	80,819	69,865	75,576
Mahoning Valley	197,113	207,892	172,136	190,436
Central and Northern Ohio	197,595	226,765	187,918	161,160
Southern Ohio	27,165	35,333	30,568	31,892
Illinois and Indiana	427,427	362,129	273,444	287,313
Mich., Minn., Mo., Wis. and Colo.	67,360	64,665	51,233	48,236
Alabama	171,823	157,441	109,667	121,073
Tennessee	828	1,102	882	825
Total	2,072,114	2,035,920	1,629,991	1,638,697

Capacities in Blast May 1

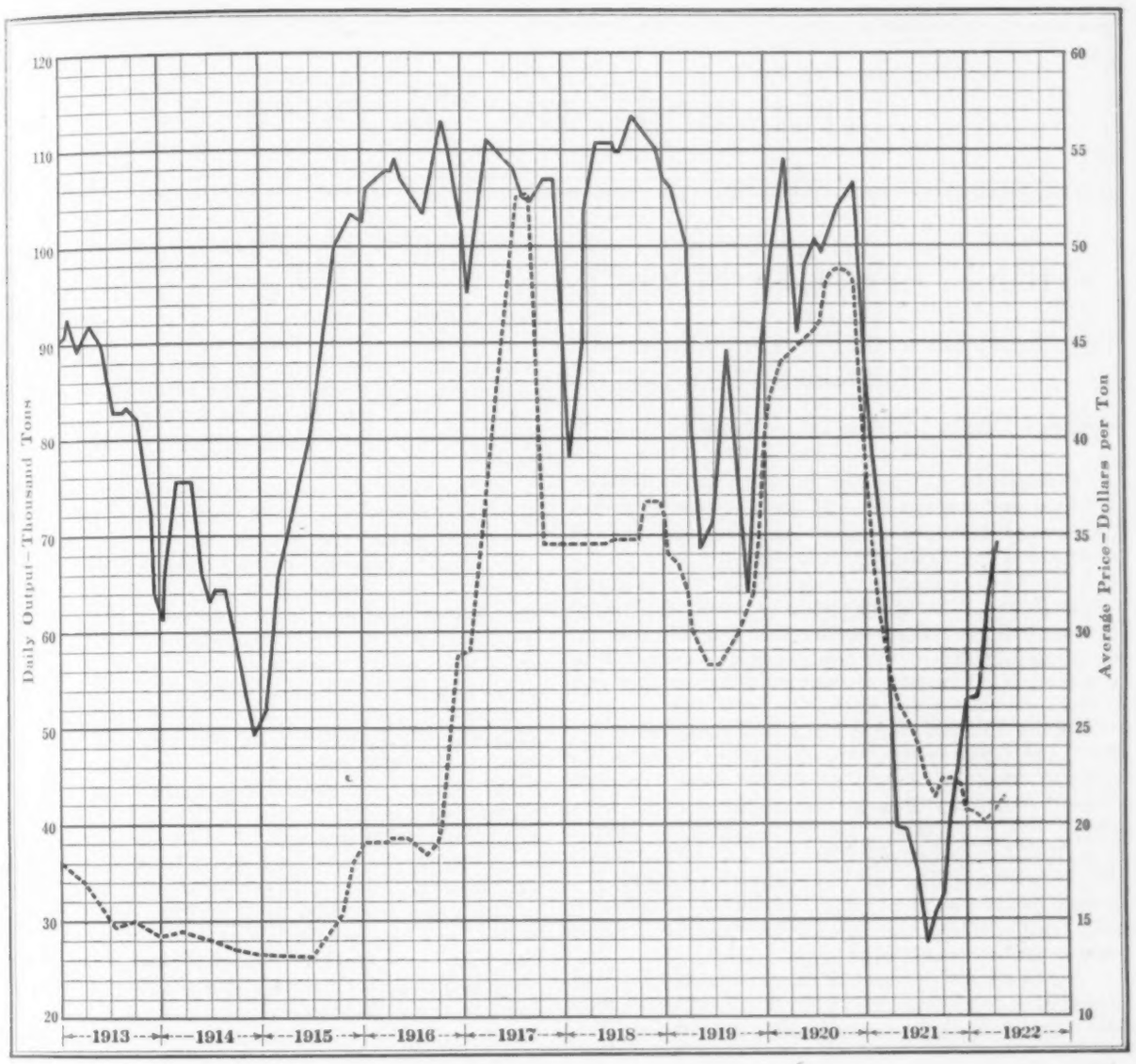
The following table shows the number of furnaces in blast May 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast April 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	May 1 In Blast	May 1 Capacity per Day	April 1 In Blast	April 1 Capacity per Day
New York:					
Buffalo	22	10	4,370	10	4,250
Other New York	4	0	....	0	....
New Jersey	4	1	160	1	135
Ferro	..	..	....	..	....
Pennsylvania:					
Lehigh Valley	18	5	1,920	3	970
Spiegel	2	1	140	1	95
Schuylkill Valley	15	6	2,030	5	1,835
Lower Susquehanna	10	2	950	1	500
Lebanon Valley	6	0	....	0	....
Ferro	2	1	70	1	80
Pittsburgh District	55	34	17,120	35	17,370
Ferro and Spiegel	4	3	350	3	345
Shenango Valley	19	5	2,130	5	2,330
West. Pennsylvania	26	8	3,460	9	3,500
Maryland	6	2	765	1	465
Wheeling District	15	3	1,815	5	2,600
Ohio:					
Mahoning Valley	28	14	6,800	14	6,635
Central and Northern	26	12	6,585	14	7,315
Southern	16	2	880	3	1,145
Illinois and Indiana	42	25	13,200	22	11,690
Mich., Wis. and Minn.	11	5	2,290	3	1,325
Colorado and Missouri	6	3	1,115	2	760
The South:					
Virginia	16	0	....	0	....
Kentucky	7	1	315	1	315
Alabama	41	18	6,380	15	5,320
Tenn., Ga. and Texas	16	1	30	1	35
Total	417	162	72,875	155	69,015

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1920	1921	1922	1920	1921	1922
Jan.	2,232,455	1,932,159	1,306,045	23,957	22,228	6,874
Feb.	2,181,679	1,625,695	1,311,170	28,038	29,013	8,540
Mar.	2,480,668	1,323,443	1,629,982	35,275	41,294	13,695
Apr.	1,968,542	1,015,621	1,707,902	27,628	24,310	19,209
May	2,128,720	1,024,678	.....	33,407	9,232	.....
June	2,209,770	883,312	.....	34,751	4,536	.....
July	2,230,567	715,664	.....	36,789	5,524	.....
Aug.	2,254,943	807,144	.....	36,985	3,878	.....
Sept.	2,247,250	815,692	.....	39,546	3,289	.....
Oct.	2,393,644	1,034,312	.....	34,786	3,902	.....
Nov.	2,150,075	1,138,789	.....	26,944	3,525	.....
Dec.	2,047,167	1,276,381	.....	28,023	3,953	.....

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphio. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1918—Gross Tons

	1918	1919	1920	1921	1922
Jan.	2,411,768	3,302,260	3,015,181	2,416,292	1,644,951
Feb.	2,319,299	2,940,168	2,978,879	1,937,257	1,629,991
Mar.	3,213,091	3,090,243	3,375,907	1,595,522	2,035,920
1st Quar.	7,944,158	9,332,671	9,369,967	5,949,071	5,310,862
Apr.	3,288,211	2,478,218	2,739,797	1,193,041	2,072,114
May	3,446,412	2,108,056	2,985,682	1,221,221	.....
June	3,323,791	2,114,863	3,043,540	1,064,833	.....
July	3,420,988	2,428,541	3,067,043	864,555	.....
Aug.	3,389,585	2,743,388	3,147,402	954,193	.....
Sept.	3,418,270	2,487,965	3,129,323	985,529	.....
Oct.	3,486,941	1,863,558	3,292,597	1,246,676	.....
Nov.	3,354,074	2,392,350	2,934,908	1,415,481	.....
Dec.	3,433,617	2,633,268	2,703,855	1,649,086	.....
Ttl. yr.	*38,506,047	30,582,878	36,414,114	16,543,686	.....

*These totals do not include charcoal pig iron. The 1921 production of this iron was 94,730 tons.

Wabana Ore for Europe

Roy M. Wolvin, president British Empire Steel Corporation, confirms the report to the effect that this company has sold 400,000 tons of ore to be shipped from the Wabana mines to Europe. He adds that the sales amount to not less than 400,000 tons.

The Gas Combustion Co., Pittsburgh, recently filled its fourth repeat order for Bradshaw burners at the New Castle, Pa., plant, the Carnegie Steel Co. The company also has received an order to equip the new boiler plant of the Tennessee Coal, Iron & Railroad Co., Ensley, Ala., with the pressure type Bradshaw burner and to completely equip the boiler plant of the Delaware River Steel Co. with Bradshaw burners.

The American Tube & Stamping Co. will reopen its Bridgeport plant, on May 13, according to Edmund C. Mayo, president. The plant has been closed 15 months, with the exception of the cold rolling mills, which are operating practically at capacity.

Iron and Steel Markets

STRIKE EFFECTS SLIGHT

Can April Gain in Pig Iron Output Be Maintained?

Railroad Demand Holds Up—Advance of $2.50 in Semi-Finished Steel

Production of iron and steel in western Pennsylvania and eastern Ohio is slightly less this week because of the coal strike, but the total for all districts is but little affected. The pig iron statistics for April, which have been looked for with unusual interest, show an increase upon the March output, though indications are that the rate was not quite maintained in the final week of the month in the districts tributary to western Pennsylvania coal fields.

In the 30 days of April pig iron production was 2,072,114 tons, or 69,070 tons per day, against 2,035,920 tons in March, or 65,675 tons per day. Twenty furnaces blew in last month and 13 were blown out or banked. Active capacity on May 1 was 72,875 tons per day for 162 furnaces, against 69,015 tons per day for 155 furnaces on April 1—a gain of 3860 tons per day. However, in conserving fuel, some stacks have been running a trifle slower in the past week.

Based on active capacity pig iron output on May 1 was at a yearly rate of 26,600,000 tons, or 10,000,000 tons more than was actually produced in 1921.

The Steel Corporation's operating percentage in steel, which has ranged between 70 to 75 in the past month, is estimated this week at slightly above 70, which is substantially the average of independent companies also.

No concerted attempt is being made to resume operations at Steel Corporation and other mines in the Connellsville region, the intention of the operators evidently being to allow the situation to run until the men get ready to return to work. Meanwhile large quantities of coking coal are being brought into the Pittsburgh and nearby districts from fields farther South. Loadings of coal by railroads serving the western Pennsylvania district, including important union mines, were 1960 cars on Friday, 1883 cars on Saturday and 1645 cars on Monday. Normally they are about 8000 cars.

The effect of the strike in stiffening the steel market has been more pronounced this week, especially in semi-finished steel. At Pittsburgh open-hearth billets have advanced from $29.50 to $32 and forging billets at $37 are also up $2.50.

Pittsburgh reports the slowing up of several sheet and tin plate mills which depend on outside sources for steel. Several mills in that district have drawn upon Chicago for sheet bars, which means a freight of $5.80 per ton added to their costs.

Chicago, still under the stimulus of railroad demand, shows a fairly buoyant market. The Illinois Steel Co. is operating at 86 per cent of capacity, and the two Steel Corporation blast furnaces at Duluth, idle for months, have started up to make pig iron for shipment to South Chicago. Railroad buying at Chicago is unabated, the building industries are active, automobile production is large, and stocks of farm equipment manufacturers are being reduced at a rate pointing to important resumptions in production by Aug. 1.

In finished products the bookings of the leading interest at Chicago last week were nearly twice its shipments. In Central and Eastern districts buying has been at a less rate than in March and early April, most buyers being covered for the second quarter.

Under these conditions some mills are less disposed and others less able to promise definite deliveries and some are having an almost forgotten experience in picking business with a profit in it.

Prices of independent producers of plates, shapes and bars are more generally 1.60c., though it appears a good many protections given at 1.35c. or 1.40c. are still running.

A sale of 70,000 tons of pig iron to a radiator company, delivery over the next seven months, has attracted much attention as representing the judgment of a careful buyer, but few consumers are disposed to buy for distant delivery and most furnaces take a like position in regard to selling. The trend of prices is still upward. The latest advances include 50c. on Alabama iron, $1 on foundry, malleable and basic at Chicago, $2 on basic in eastern Pennsylvania and from 50c. to $2 in other centers. Silveries have again been advanced $1, making $3 in the past three weeks. Eastern Pennsylvania furnaces are more comfortable in view of easier conditions in the coke market.

The placing of 2750 cars by the Chicago & Northwestern brings the total purchases of freight cars for the past four months close to 60,000, or over two and one-half times as many as were bought in all of 1921, comparing with a four months' average in the ten years before the war of 61,600 cars. Pending business totals over 9100 cars.

The week's bookings of two locomotive builders amount to 139 engines, the Chicago & Northwestern, the Boston & Maine and the Atlantic Coast Line being the leading buyers.

The New York Central Lines have distributed orders among six rail mills for an additional lot of 24,800 tons of rails.

Fabricated steel awards of the week amount to practically 100 per cent of the theoretical capacity of the bridge and structural shops of the country, and new projects appearing aggregate 31,000 tons, or 75 per cent of a week's full capacity.

Two Eastern shipyards are inquiring for a total of 9000 tons of steel after long abstention from the market. In general plate orders are increasing.

Pittsburgh

PITTSBURGH, May 2.

No concerted attempt is being made to get the striking mine and coke oven workmen in the Connellsville region back to work, it apparently being the plan of the operators to let the men remain idle until they feel like coming back. Large quantities of coking coal are being brought out of the Southern field into this and nearby steel-making centers, but these supplies do not appear to have brought about any increase

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	May 2, 1922	Apr. 25, 1922	Apr. 4, 1922	May 3, 1921
No. 2X, Philadelphia‡	$25.40	$25.40	$21.34	$25.84
No. 2, Valley furnace†	23.00	23.00	19.00	24.00
No. 2, Southern, Cin'ti†	**21.50**	21.00	20.00	27.50
No. 2, Birmingham, Ala.†	**17.00**	16.50	15.50	23.00
No. 2 foundry, Chicago*	**22.00**	21.00	20.00	23.00
Basic, del'd, eastern Pa.	**23.50**	21.50	20.00	25.00
Basic, Valley furnace	23.00	23.00	18.00	22.50
Valley Bessemer, del. Pitts.	23.96	23.96	21.46	26.96
Malleable, Chicago*	**22.00**	21.00	20.00	24.00
Malleable, Valley	23.00	23.00	19.00	24.50
Gray forge, Pittsburgh	24.46	24.46	20.71	24.96
L. S. charcoal, Chicago	28.00	28.00	26.00	38.50
Ferromanganese, seaboard	65.00	65.00	62.50	90.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	**32.00**	29.50	29.50	37.00
O.-h. billets, Pittsburgh	**32.00**	29.50	29.50	37.00
O.-h. sheet bars, P'gh	31.00	31.00	31.00	39.00
Forging billets, base, P'gh	**37.00**	34.50	34.50	42.00
O.-h. billets, Phila	**36.74**	35.24	35.24	42.74
Wire rods, Pittsburgh	38.00	38.00	38.00	48.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.50	1.50	1.40	2.20
Light rails at mill	1.50	1.50	1.45	2.20

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	**1.96**	1.86	1.81	2.35
Iron bars, Chicago	1.65	1.65	1.60	2.38
Steel bars, Pittsburgh	1.50	1.50	1.50	2.10
Steel bars, Chicago	1.60	1.60	1.60	2.48
Steel bars, New York	1.88	1.88	1.88	2.48
Tank plates, Pittsburgh	1.50	1.50	1.40	2.20
Tank plates, Chicago	1.60	1.60	1.60	2.58
Tank plates, New York	1.88	1.88	1.78	2.58
Beams, Pittsburgh	1.50	1.50	1.50	2.20
Beams, Chicago	1.60	1.60	1.60	2.58
Beams, New York	1.88	1.88	1.88	2.58
Steel hoops, Pittsburgh	2.00	2.00	1.90	2.75

Sheets, Nails and Wire,	May 2, 1922	Apr. 25, 1922	Apr. 4, 1922	May 3, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.00	4.00
Sheets, galv., No. 28, P'gh	4.15	4.15	4.00	5.00
Sheets, blue an'l'd, 9 & 10,	2.40	2.40	2.25	3.10
Wire nails, Pittsburgh	2.40	2.40	2.40	3.25
Plain wire, Pittsburgh	2.25	2.25	2.25	3.00
Barbed wire, galv., P'gh	3.05	3.05	3.05	4.10
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$6.25

Old Material, Per Gross Ton:				
Carwheels, Chicago	$19.50	$19.50	$17.75	$14.50
Carwheels, Philadelphia	16.00	16.00	15.75	16.00
Heavy steel scrap, P'gh	17.00	17.00	16.00	13.00
Heavy steel scrap, Phila.	14.50	14.50	13.50	11.00
Heavy steel scrap, Ch'go	**15.25**	15.00	13.00	11.50
No. 1 cast, Pittsburgh	**18.50**	17.50	16.50	18.00
No. 1 cast, Philadelphia	**18.00**	17.50	17.00	18.00
No. 1 cast, Ch'go (net ton)	**16.25**	15.50	14.25	13.50
No. 1 RR. wrot., Phila.	**16.50**	16.00	15.50	15.00
No. 1 RR. wrot. Ch'go (net)	13.00	13.00	11.75	10.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$6.00**	$5.50	$3.40	$3.25
Foundry coke, prompt	**6.00**	6.00	4.50	4.50

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.00	13.00	12.75	12.75
Electrolytic copper, refin'y	12.75	12.75	12.50	12.37½
Zinc, St. Louis	**5.02½**	5.00	4.75	4.95
Zinc, New York	**5.37½**	5.35	5.10	5.45
Lead, St. Louis	**5.25**	5.20	4.65	4.50
Lead, New York	5.40	5.40	4.90	4.50
Tin (Straits), New York	**31.25**	31.12½	29.50	31.87½
Antimony (Asiatic), N. Y.	**5.37½**	5.00	4.50	5.25

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.
The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, May 2, 1922, Finished Steel, 2.084c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rail's, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

April 25, 1922,	2.084c.
April 4, 1922,	2.048c.
May 3, 1921,	2.764c.
10-year pre-war average,	1.689c.

Composite Price, May 2, 1922, Pig Iron, $22.23 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

April 25, 1922,	$21.98
April 4, 1922,	18.47
May 3, 1921,	23.22
10-year pre-war average,	15.72

in the activity of blast furnace blowing engines nor is the coking time in by-products plants being shortened. Moreover, the coal coming from points not ordinarily tapped comes high, not only because of high costs at the mines but because of very stiff freight charges. So little semi-finished steel is available at present that no trouble is being experienced in obtaining substantial advances over the prices which prevailed a month ago, but the advances are not out of line with the rise of the past month in pig iron and scrap.

In finished lines, there seems to be little disposition to let prices run wild and only in the case of sheets are premiums for early delivery being named and this only by one or two makers. Conservatism is the keynote of the sales policy of most steel makers because it is realized that advances based upon the coal strike would be difficult to maintain, once that trouble is settled. It is, therefore, the course of most of the trade to refuse any business that looks speculative and to discourage purchases beyond the normal requirements of regular customers.

Recent advances in pig iron appear to have halted buying in this particular territory and it is impossible in the absence of important transactions to make any further changes in quotations this week. Only small lots of beehive oven coke are being offered and prices of such lots depend very largely on how badly supplies are wanted by the buyers. Very little nearby coal is available at any price and the chief activity still is in the product of the Southern field. Loadings of coal by railroad serving the western Pennsylvania district which normally aggregate about 8000 cars, have been declining during the past few days. On Friday they were 1960 cars, on Saturday 1883 cars and yesterday 1645 cars were loaded. These figures indicate operations of about 20 per cent.

Pig Iron.—This market does not seem to be keeping pace with others. Very little business has been done here in the past week. No important inquiries lately have come out, but on the other hand offerings of iron are extremely limited and to all intents and purposes the market is at a standstill. The strength of the pig iron situation in other centers cannot fail to have an influence upon this market when some business does

come out, but with transactions as limited as they have been lately, it is impossible to make any change in prices from those of a week ago. It is reported that a Cleveland interest has sold basic iron at $24, furnace, and now is asking $25, but no Valley basic has been sold above $23, and there is some doubt that even that price has been done, as the buyer reported to have paid that price denies it. The average price of basic iron from Valley furnaces in April as compiled by W. P. Snyder & Co., Pittsburgh, was $19.30, with $20.50 the maximum price reported for this calculation. That price compares with $18 in March. The average price of Bessemer in April, according to the same company, was $20.543, as compared with $19.388 in March. Such sales of foundry iron as have lately been made have been at $23 for the base grade.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$23.00
Bessemer	22.00
Gray forge	22.50
No. 2 foundry	23.00
No. 3 foundry	22.50
Malleable	23.00

Ferroalloys.—For the third time in three consecutive weeks, Jackson, Ohio, makers of Bessemer ferrosilicon and silvery iron have advanced prices $1 per ton, the last advance being effective April 26. There is little demand for either product in this district. A steady demand for small lots of 80 per cent ferromanganese is reported. The Carnegie Steel Co. is sold ahead for the present quarter and its quotation of $72.50 at Atlantic seaboard is regarded as a price to discourage new inquiries. Other domestic producers are quoting $70 Atlantic seaboard, and are getting a little prompt business. Agents of English makers still have authority to accept business at $65 Atlantic seaboard. The principal makes of spiegeleisen is quoting $35, furnace, for 19 to 21 per cent material and $34 for 16 to 19 per cent, but no sales are reported at these prices, which are quoted chiefly because this company is not anxious for additional business.

We quote 78 to 82 per cent ferromanganese, $70 to $72.50 c.i.f. Atlantic seaboard for domestic and $65 for English. Average 20 per cent spiegeleisen, $35 furnace; 16 to 19 per cent, $34 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $39.50; 11 per cent, $42.80; 12 per cent, $46.10; 13 per cent, $50.10; 14 per cent, $55.10; silvery iron, 6 per cent, $28; 7 per cent, $29; 8 per cent, $30.50; 9 per cent, $32.50; 10 per cent, $34.50; 11 per cent, $37; 12 per cent, $39.50. The present freight rate from Jackson to New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Iron and Steel Pipe.—The market on steel pipe is extremely firm, with buyers offering more business than the mills are willing to take at this time. Practically all makers are booked as far ahead as they want to be on the present stocks of coal and the fact that the coal strike situation is not mending with much rapidity makes them cautious about adding to their obligations. Prospective line pipe business is very heavy. An inquiry is before the trade for 250 miles of 20-in. pipe for the Southwest, while the pipe for the line for the Sinclair Oil Co. from Wyoming to Kansas has yet to be placed. There are two or three good sized line pipe orders pending for the Louisiana gas field and it is conservatively estimated that all pending business amounts to at least 200,000 tons. Merchant sizes of wrought iron pipe are in steady demand. Discounts are given on page 1253.

Wire Rods.—Open market activities are much curtailed by the fact that makers have practically no tonnages available over and above their own and contract requirements. There is a uniform tendency upon the part of makers to pass up new business pending a change for the better in the fuel situation. Quotations are entirely nominal and any mill which could be induced to take on new orders probably would demand at least $40 base. Prices are given on page 1253.

Wire Products.—Leading makers in this district have about all the business they want in nails and are giving little consideration to new inquiries. In other wire products, attention is being given only to specifications against existing orders, although occasionally a little business is being accepted in barbed wire and fence to balance mill schedules. No trouble is being experienced by makers in obtaining specifications. So far, the coal miners' strike has not materially affected plant activities. The American Steel & Wire Co. has not yet met the advance announced by independents about a month ago, but is not a free seller because of the possible effect of the coal strike on production.

We quote wire nails at $2.40 to $2.50 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.25 base per 100 lb., Pittsburgh.

Billets, Sheet Bars and Slabs.—Makers continue to fall behind their obligations because it is impossible to enlarge present ingot production. Most of the manufacturers are out of the market in that they are not entertaining new inquiries, fearing that they will become too heavily committed in the event that the fuel situation does not show early betterment. We note a sale of 1000 tons of 4-in. billets at $32.50, Pittsburgh, and a Cleveland maker of slabs named $34, Cleveland, on 3000 tons for this district for June shipment. Inquiry for sheet bars is keen, with brokers especially active in pursuit of supplies. So little tonnage of any kind of semi-finished steel is available and so little actual business is going on that quotations are not much more than appraisals. The common quotation of those who will take sheet bar business is $35, mill.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $32 to $34; 2 x 2-in. billets, $33 to $35; Bessemer and open-hearth sheet bars, $33 to $35; slabs, $32 to $34; forging billets, ordinary carbons, $37 to $39, all f.o.b. Youngstown or Pittsburgh mills.

Structural Material.—Structural awards to local fabricators are fairly numerous, but as a rule involve rather small tonnages. The Pittsburgh Bridge & Iron Co. will furnish 125 tons for a building for the Erie Metal Furniture Co., Erie, Pa., while the Blaw Knox Co. has been awarded 300 tons for the shop here of the Crane Co., Chicago, and the Pittsburgh-Des Moines Steel Co. has taken 125 tons for the Pennsylvania Hotel, Bedford, Pa. Plain material is firm, with the Carnegie Steel Co. quoting 1.50c. to 1.60c., Pittsburgh, and the independents 1.60c. to 1.70c. Prices are given on page 1253.

Sheets.—There has been no material let down as yet in sheet mill operations, but the shortage of steel is steadily growing more acute, and it will be somewhat surprising if the current month makes as good a showing as April in the matter of production and shipments. The American Sheet & Tin Plate Co. in April shipped out a slightly larger tonnage than it did in March, and the latter month for that company was the best since the corresponding month in 1920. The report of the National Association of Sheet and Tin Plate Manufacturers shows that unfilled orders as of April 30 were 155 per cent of capacity, sales slightly above 100 per cent of capacity, shipments 65 per cent of capacity, and operations close to 70 per cent. Monthly capacity is rated at 244,500 net tons. Prices are very well established at the advance of early April, and on occasional transactions premiums are being paid for early delivery. A sale of blue annealed sheets at 2.75c., base, is one instance of this sort. In a general way there is too little business to support higher quotations than the regular ones such as are given on page 1253.

Steel Skelp.—The shortage of steel is affecting the available supply of this product, and while the price of the Carnegie Steel Co. still is 1.50c., it is not taking on new business under 1.60c., and the latter also is the minimum of price of independent makers.

Iron and Steel Bars.—The shortage of steel is affecting bar mill operations to a greater extent than most of the other classes of finishing mills, and with makers getting further behind in their deliveries the supply situation is decidedly strong. The Carnegie Steel Co. still is quoting 1.50c., but this is its minimum to regular customers, and there is no promise of delivery prior to July 1, while to irregular customers and on undesirable specifications its price is 1.60c. Independents still open for business are quoting 1.60c., Pittsburgh, and upward. There is no change in iron bar prices, but the market is firm.

We quote steel bars rolled from billets at 1.50c. to 1.70c.; reinforcing bars, rolled from billets, 1.50c. to 1.70c. base; reinforcing bars, rolled from old rails 1.50c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Plates.—The Carnegie Steel Co. continues to take business from regular customers at 1.50c., base, Pittsburgh, but 1.60c. is its minimum to new buyers. This company is sold ahead for at least a month, and is not promising deliveries prior to that time. Independent quotations range from 1.60c. to 1.70c., Pittsburgh.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.70c., f.o.b. Pittsburgh.

Steel Rails.—Prices of less than 1.50c. base for light rails rolled from billets have disappeared and the market now is firm at that price. A fair amount of business is coming to makers, but the volume is moderate, due to the fact that so many coal mines are idle.

We quote 25 to 45-lb. sections, rolled from new steel, 1.50c. base; rolled from old rails, 1.40c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Tin Plate.—Some makers in this district who do not make their own steel have begun to suffer some contraction in production through inability to obtain full supplies of sheet bars. Can makers, however, anticipated their requirements to a considerable extent, and a pinch in the supply is more prospective than actual. There continues to be talk of an advance, but to date no action has been taken.

Boiler Tubes.—There is a gradual firming up in prices, although on lap welded steel tubes an Eastern maker still is reported to be giving more than the regular discount. Business is improving and because of the menace to steel production contained in the coal strike situation, the desire for business is not as keen as it was recently. Discounts are given on page 1253.

Hot-Rolled Flats.—All makers of hoops and bands are quoting 2c. base, Pittsburgh, as a minimum, and do not appear anxious to take on additional tonnages at that price. On hot-rolled strips 2c. base, Pittsburgh, also is minimum, with the effort of makers to hold the market at that price and not to let buyers put in orders in excess of their normal requirements. The demand for strips is active because some makers are unable to meet their obligations and their customers are seeking tonnages from other sources. If so disposed, strip makers might book themselves ahead for several months at well above the current base, but they are refraining from selling too far ahead because of the effect it would have upon prices.

Cold-Rolled Strips.—The market is extremely firm at 3.65c. base, Pittsburgh, and here as with hot-rolled strips, makers are passing up all speculative demands and allowing regular customers to specify for only their normal requirements for a short period ahead.

Nuts and Bolts.—Business with makers in this district is good only by comparison with the period of dullness through which they recently passed. There is no change in prices, but as raw materials are stronger and rivet prices have been advanced, a move to put bolts and nuts on a more profitable basis would not be surprising. Discounts are given on page 1253.

Rivets.—Leading makers have established a minimum of $2.25 base per 100 lb., Pittsburgh, on large structural and ship rivets and $2.35 base on heavy boiler rivets. Small rivets cannot be bought below 75 and 10 per cent off list. Prices and discounts are given on page 1253.

Coke and Coal.—Production of Connellsville beehive oven coke continues to dwindle and the few cars which are reaching the market sell at prices governed largely by how badly supplies are wanted. Practically all of the coke offered is either under or over-burned and not much attempt is being made to distinguish between grades. Prices range anywhere from $6 to $7 per net ton at oven, and the use to which the coke is going fixes the price. It is hard to interest blast furnace interests in tonnages at above $6, but for foundry use the prevailing range is from $6.50 to $7. According to the Connellsville *Courier*, production of coke for the week ended April 22 was only 64,980 net tons, or only about 44 per cent of the output of the last week prior to the strike. Figures for the week ended April 29 are expected to show a further shrinkage since there has been no appreciable gain in either coal mine or coke oven activities. Small lots of coal mined nearby are selling from $3 to $3.50, for steam and by-product grades and as high as $3.75 for gas coal. Pocahontas coal is selling anywhere from $2.25 to $2.75, at mine, and Kentucky from $2.50 to $3. Freight from the Southern fields into this district, an emergency tariff, is about $3.10 per ton. The Youngstown district has a rate of $2.66.

Cold-Finished Steel Bars and Shafting.—Makers are having some difficulty in keeping up with their obligations, due to the fact that production of hot-rolled bars is affected by the fuel situation to the extent that makers have been obliged to apportion their outputs. Occasionally a price of 2c. base, Pittsburgh, is made for carload lots by makers who either do not want an order or who have not sufficient hot-rolled bars to be interested in new business. As a general rule, however, there is no very pronounced attempt at present to obtain more than 1.90c. But insistence on the less than carload differential of $5 per ton is universal. There is no change in ground shafting, which holds at 2.25c. base, mill, for carload lots.

Spikes.—The Jones & Laughlin Steel Co. and Dilworth Porter & Co. in the past week have gone to $2.25 base per 100-lb. for standard railroad spikes, thus meeting the price named by the Republic Iron & Steel Co. early last month. New business in standard spikes is not especially heavy, but makers are committed against probable production over the next five or six weeks. Small spikes are quoted at $2.50 base per 100-lb. Pittsburgh, but the demand is rather moderate. Prices are given on page 1253.

Old Material—The market is somewhat quieter on the heavier grades of steel works scrap because the company which has been the principal buyers recently closed for about 25,000 tons and now is out of the market. Prices have lost none of their recent strength and probably will not so long as the fuel situation checks an enlargement of blast furnace activities and thus makes the steel makers dependent upon scrap in the maintenance of open-hearth furnace operations. Foundry grades are more in demand than they were recently and the shortage of supplies which has been uncovered has stiffened prices rather sharply. The Pennsylvania Railroad, Eastern Region, opens bids to-day on 31,720 net tons of old material, including 10,000 tons of No. 1 steel rails and 3000 tons of No. 3 and 4 rails. The Pennsylvania Railroad, Central Region, list offers about 12,000 net tons of old material.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$17.00 to $17.50
No. 1 cast, cupola size	18.50 to 19.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	17.00 to 17.50
Compressed sheet steel	15.00 to 15.50
Bundled sheets, sides and ends	14.00 to 14.50
Railroad knuckles and couplers	17.50 to 18.00
Railroad coil and leaf springs	17.50 to 18.00
Low phosphorus standard bloom and billet ends	20.00 to 21.00
Low phosphorus plates and other grades	19.00 to 20.00
Railroad malleable	15.50 to 16.00
Iron car axles	25.00 to 26.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	17.50 to 18.00
Cast iron wheels	17.00 to 17.50
Rolled steel wheels	17.50 to 18.00
Machine shop turnings	13.00 to 13.50
Sheet bar crop ends	18.00 to 18.50
Heavy steel axle turnings	15.00 to 15.50
Short shoveling turnings	14.00 to 14.50
Heavy breakable cast	17.25 to 17.75
Stove plate	13.50 to 14.00
Cast iron borings	14.00 to 14.50
No. 1 railroad wrought	13.00 to 14.00

The Ansonia Mfg. Co., Ansonia, Conn., brass goods, has announced that effective May 15, wages will be increased 15 per cent. About a year ago the company reduced wages, but at the time stated it would restore them as soon as business conditions warranted.

Chicago

CHICAGO, May 2.

Business shows no let up and prices continue to grow firmer. The bookings of the leading steel producer last week were nearly twice shipments. Such a large back log has been accumulated that no orders are being taken for specific delivery. Plates, shapes and bars are still available for shipment at mill's convenience at 1.60c., Chicago, but producers able to make early delivery are obtaining higher prices. The limitation of mill production attributable to the coal strike is being felt more every day. Sheet mills in the Pittsburgh district have come to Chicago for sheet bars, which means that a freight of $5.80 will be added to their costs. Users such as the automotive plants in the Detroit district, which ordinarily get most of their finished steel from Eastern sources, are now turning to Chicago for bars, shapes, light plates and sheets in the hope of securing material for early needs.

Mill operations in the Chicago district are substantially unchanged. The leading interest is still on an 86 per cent basis and has put in no further blast furnace capacity. Two furnaces of the Minnesota Steel Co. at Duluth, however, have gone in and their production will be shipped to Gary and South Works for use in the open hearths of those plants of the Illinois Steel Co.

The opinion is still expressed in some quarters that the steel market is merely experiencing a flurry induced by the coal strike and that a reaction will set in with the return of the miners to their jobs. The retort of the mills is that they are booked ahead so far that a decline in demand, if it really should develop, would not affect their operations for several weeks. It is also argued that there are numerous indications that the improvement in business is on a solid foundation.

Railroad buying is unabated, the building industry is active, automobile production is large and the farm equipment manufacturers are rapidly reducing their stocks of finished products. Certain important implement manufacturers, in fact, expect to have their stocks reduced by Aug. 1 to a point which will make necessary a resumption of production on a broad scale.

Pig Iron.—Local iron has advanced generally to $22 base, furnace, and demand continues strong. The leading merchant is booked to present capacity for second quarter and has accumulated a large back log extending through last half. An increase in production will soon prove necessary and to this end an additional Iroquois furnace will probably be blown in at any time, while it is also planned to light the Zenith furnace at Duluth, although this has not been definitely decided. Recent sales include 2000 tons of malleable for a Wisconsin melter, 1000 tons of foundry for an Indiana automobile maker, and 500 tons of malleable for a Chicago railroad equipment manufacturer, all for delivery over the next three months. An Illinois boiler manufacturer has closed for 1000 tons of Southern foundry. Inquiries include 5000 tons of low silicon foundry wanted for third quarter by a railroad equipment maker, and 2000 tons of malleable desired by a local melter for last half. Southern iron has advanced to a minimum of $17, Birmingham, with some producers quoting $17.50. The delivered price on material for delivery by water and rail route is now $22.92. Low phosphorus is stronger with some producers out of the market. Silvery has advanced another dollar, this being the third one dollar advance in as many weeks.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago		$28.00
Northern coke, No. 1, sil. 2.25 to 2.75		22.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25		22.00
Northern high phos		22.00
Southern No. 2	$22.92 to	24.17
Malleable, not over 2.25 sil		22.00
Basic		22.00
Low phos. Valley furnace, sil. 1 to 2 per cent copper free	32.00 to	33.00
Silvery, sil. 8 per cent		35.82

Ferroalloys.—It appears that some foreign ferromanganese is still available at $65, seaboard, but with the provision that the consumers pay any duty which may be imposed. Domestic prices range from $70 to $72, seaboard. Spiegeleisen is scarce.

We quote 78 to 82 per cent ferromanganese, $73.40 to $80.40, delivered; 50 per cent ferrosilicon, $55, delivered; spiegeleisen, 16 to 18 per cent, $46.50, delivered.

Cast Iron Pipe.—The market is active and prices are firm at $35, base Birmingham, for 6-in. and larger. Awards include:

Detroit, 4000 tons, to Lynchburg Foundry Co.

Highland Park, Mich., 200 tons, to James B. Clow & Sons.

Fort Wayne, Ind., 200 tons, to Hammond-Bird Iron Co.

Willoughby, Ohio, 150 tons, to United States Cast Iron Pipe & Foundry Co.

Bay City, Mich., 500 tons, to United States Cast Iron Pipe & Foundry Co.

Pending business includes:

Akron, Ohio, 1500 tons, United States Cast Iron Pipe & Foundry Co., low bidder.

Oklahoma City, Okla., 6000 tons of 3-in. to 30-in., bids in May 2.

Milan, Ohio, one mile of 6-in., May 2.

Ogden, Utah, 3000 tons, contemplated.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $48.10; 6-in. and above, $44.10; class A and gas pipe, $3 extra.

Rails and Track Supplies.—The Pere Marquette has placed 3500 tons of rails with the Inland Steel Co. in addition to 1500 tons ordered from that producer some weeks ago. New rail business is light, but specifications are liberal. Buying of track fastenings is brisk and prices are growing steadily firmer. Notable among recent orders was one for 3000 tons of angle bars. The Chicago & Northwestern is inquiring for 8000 to 10,000 kegs of spikes and bolts.

Standard Bessemer and open hearth rails, $40; light rails rolled from new steel, 1.50c., f.o.b. makers' mills.

Standard railroad spikes, 2.15c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.10c. to 3.15c., Pittsburgh; tie plates, steel and iron, 1.85c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Bolts and Nuts.—The new discounts are firm and business is increasing. Some makers are losing orders because they cannot make deliveries desired. Bolt and nut plants are not running full, but this is due to a shortage of steel rather than of business. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1253.

Jobbers quote structural rivets, 3.15c.; boiler rivets, 3.25c.; machine bolts up to ⅞ x 4 in., 60 and 10 per cent off; larger sizes, 60 off; carriage bolts up to ⅞ x 6 in., 60 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3.50 off; blank nuts, $3.75 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off. Quantity extras are unchanged.

Structural Material.—Structural lettings are not so numerous as two or three weeks ago, but this is accounted for by the fact that many jobs were awarded on the eve of advances in plain material. Notwithstanding the reaction following advances in mill prices, much work is being figured on and a number of fair-sized structures have been let. It has been definitely announced that the building which will replace the Stratford Hotel, Chicago, will not be a hostelry but will be an office building instead. It will require about 5000 tons. The mills continue to receive heavy specifications for plain material. The price situation is unchanged, but strong. Fabricating awards include:

Cahokia plant, Union Electric Light & Power Co., St. Louis, 3000 tons, to Fort Pitt Bridge Works.

Federal Reserve Bank, New Orleans, 750 tons, to McClintic-Marshall Co.

Addition to Crane Technical High School, Chicago, 1718 tons, to Hansell-Elcock Co.

Commissioners of Port of New Orleans, Boydras Street shed, 400 tons, to Decatur Bridge Co.

Ruggles & Rademacher Co., salt plant, Manistee, Mich., 600 tons, to Wisconsin Bridge & Iron Co.

St. Louis & San Francisco Railway bridge, 120 tons, to Wisconsin Bridge & Iron Co.

Scottish Rite Temple, Little Rock, Ark., 300 tons, to Virginia Bridge & Iron Works.

Cold storage plant for C. Marty, Chicago, 175 tons, to Midland Structural Steel Co.

Pending business includes:

Walker Apartment Hotel, Joliet, Ill., 600 tons.

La Salle Extension Building, Chicago, 1000 tons.

Superstructure for Federal Reserve Bank, Minneapolis, 1000 tons.

International Harvester Co., motor truck plant, Fort Wayne, Ind., 1500 tons, bids in.

The mill quotation on plain material is 1.60c. to 1.70c., Chicago. Jobbers quote 2.48c. for plain material out of warehouse.

Sheets.—Buying is brisk and prices are strong, although local producers have not followed the advances recently made by certain Eastern independents.

Mill quotations are 3.15c. for No. 28 black, 2.40c. for No. 10 blue annealed and 4.15c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 38c. per 100 lb.

Jobbers quote blue annealed, 3.53c.; black, 4.30c.; galvanized, 5.30c.

Plates.—The steel for the 3050 cars placed by the Chicago & Northwestern, amounting to about 25,000 tons of plates, shapes and bars, will be furnished by the Illinois Steel Co. About 1000 tons of plates will be required in 100 service station tanks for the Standard Oil Co., 50 of which will be constructed by the company's own forces and the remainder by an Eastern fabricator. Specifications are heavy and new business shows no signs of abatement. The price situation remains unchanged. One mill which is able to make fairly early deliveries continues to book business at 1.80c., Chicago, while from other sources material is still available at 1.60c., for shipment at mill's convenience.

The mill quotation is 1.60c. to 1.80c., Chicago. Jobbers quote 2.48c. for plates out of stock.

Wire Products.—Demand is unabated and prompt delivery can no longer be obtained on some finished products. Warehouse stocks in the hands of producers are much depleted and a shortage of rods due to the coal strike makes it difficult to increase mill operations to take care of the steadily growing wants of customers. As a result, mills are accepting only the most attractive business offered. The leading producer has made no change in its prices thus far. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1253.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.10 per 100 lb.; No. 9 and heavier bright basic wire, $3.25 per 100 lb.; common wire nails, $3.25 per 100 lb.; cement coated nails, $2.75 per keg.

Bars.—Demand for soft steel bars is heavy and it is to be noted that buyers who ordinarily get their supply from Eastern mills are now turning to the Chicago market in the hope of obtaining material for early needs. This is true particularly of the Detroit district automobile manufacturers. The larger local producers, however, are taking no business for specific delivery, being booked ahead 60 to 90 days. Material for delivery at mill's convenience can still be bought at 1.60c., Chicago, but considerable tonnage is being booked at higher prices. Bar iron and hard steel bar prices are firm and business in these products is steadily increasing.

Mill prices are: Mild steel bars, 1.60c. to 1.70c., Chicago; common bar iron, 1.65c., Chicago; rail carbon, 1.60c. mill or Chicago.

Jobbers quote 2.38c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.30c. for rounds and 3.80c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.20c. base. Hoops, 3.23c. Bands, 2.98c.

Reinforcing Bars.—Lettings and inquiries for reinforced steel are numerous and both mill and warehouse prices are strong. The Grant Park Stadium, a project involving 3000 tons, has been revived, but it is reported that action on it may again be deferred probably until fall. Current awards include:

Central public warehouse, Indianapolis, 300 tons, to Corrugated Bar Co.

Road work, Champaign and Piatt counties, Illinois, 110 tons, to Truscon Steel Co.

Road work, Cook, Dupage and Lake counties, Illinois, 210 tons, to Paul J. Kalman Co.

Endion Reservoir, Duluth, Minn., 730 tons, to C. A. P. Turner Co.

Broadmore Hotel, Chicago, 200 tons, to Inland Steel Co.

Viaduct for Illinois Central, Homewood, Ill., 110 tons, to Truscon Steel Co.

Pending work includes:

Mid-West Utilities Co., power station, Tulsa, Okla., 500 tons.

Gray Stone Inn, Bedford, Ind., 100 tons.

Sewage disposal plant, Decatur, Ill., 500 tons.

Reinforcing for 40 miles of roads in Lake County, Ill., 100 tons.

Old Material.—The market continues to advance and it is interesting to note that prices have now reached a level sufficiently high to bring out some of the accumulated yard stocks. Low phosphorus grades are particularly strong because of the scarcity of low phosphorus pig iron, some blast furnaces making this analysis having withdrawn from the market. Consumptive buying is still widely distributed, although a few important users are holding back in an effort to stem further price advances. Railroad lists include the Burlington, 4500 tons, and the Northwestern and Pennsylvania Southwestern Region 3000 tons each.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$17.50 to $18.00
Cast iron car wheels	19.50 to 20.00
Relaying rails	22.50 to 27.50
Rolled or forged steel car wheels	17.50 to 18.00
Steel rails, rerolling	16.25 to 16.75
Steel rails, less than 3 ft	16.00 to 16.50
Heavy melting steel	15.25 to 15.75
Frogs, switches and guards cut apart	15.25 to 15.75
Shoveling steel	14.75 to 15.25
Low phos., heavy melting steel	18.00 to 18.50
Drop forge flashings	10.50 to 11.00
Hydraulic compressed sheet	12.50 to 13.00
Axle turnings	14.00 to 14.50
Per Net Ton	
Iron angles and splice bars	16.50 to 17.00
Steel angle bars	13.75 to 14.25
Iron arch bars and transoms	17.50 to 18.00
Iron car axles	22.50 to 23.00
Steel car axles	15.50 to 16.00
No. 1 busheling	12.00 to 12.50
No. 2 busheling	7.50 to 8.00
Cut forge	13.75 to 14.25
Pipes and flues	10.25 to 10.75
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	13.75 to 14.25
Steel knuckles and couplers	16.00 to 16.50
Coil springs	16.00 to 16.50
No. 1 machinery cast	16.25 to 16.75
No. 1 railroad cast	15.75 to 16.25
Low phos. punchings	15.00 to 15.50
Locomotive tires, smooth	13.50 to 14.00
Machine shop turnings	10.50 to 11.00
Cast borings	8.50 to 9.00
Stove plate	14.00 to 14.50
Grate bars	13.50 to 14.00
Brake shoes	13.50 to 14.00
Railroad malleable	15.00 to 15.50
Agricultural malleable	15.00 to 15.50

Railroad Equipment Business

The Chicago & North Western has distributed orders for 2750 freight cars in addition to the 300 Roger ballast cars awarded to the American Car & Foundry Co., as reported in our issue of last week. The new lettings include: 625 box and 500 flat cars to the Western Steel Car & Foundry Co., 250 refrigerator cars to the American Car & Foundry Co., 250 gondola and 500 stock cars to the Pullman Co., 625 box cars to the Standard Steel Car Co.

The Chesapeake & Ohio has ordered 63 passenger service cars from the Pressed Steel Car Co.

The Southern Railway is expected to place orders this week for 2500 box and automobile cars.

Orders for 139 locomotives have been placed during the past week with the two leading builders, the American Locomotive Co. and the Baldwin Locomotive Works. The Chicago & Northwestern Railroad covered with the American company for a total of 50, of which 20 are Mikado type, 20 switching engines and 10 Pacific type. The Boston & Maine has ordered 22 switching engines and two of the Mallet type, and other smaller orders booked by the same company include the following: New York, New Haven & Hartford, 5 switching engines; Buffalo Slag Co., 1 switching locomotive; Standard Slag Co., 1 switching locomotive; Wayne Coal Co., 2 switching locomotives; Sorocabana Railroad of Brazil, 10 of the Mikado type and the Mogyana Railroad of Brazil, 1 of the Pacific type.

The Baldwin Locomotive Works has received orders for 20 locomotives from the Atlantic Coast Line and 25 from Patagonia.

The Santa Fe is inquiring for 2000 box cars and the Missouri Pacific for 2000 automobile cars. The Northern Pacific has entered the market for 1000 box, 250 stock, 250 ballast, 250 gondola, and 70 passenger service type refrigerator cars. The Nickel Plate is inquiring for 400 refrigerator cars. The Metropolitan West Side Elevated, Chicago, wants 100 double end passenger motor cars and the Illinois Central is inquiring for five passenger cars.

New York

NEW YORK, May 2.

Pig Iron.—The market is strong but not very active and prices have changed little, although the usual quotation now is $24.50 for No. 2 plain eastern Pennsylvania, $25 for No. 2X and $26 to $26.50 for No. 1X. The differential between No. 1 and No. 2X is greater than usual on account of the coke situation, as more coke is required to make the high silicon irons. Some charcoal iron is being sold at the new price of $24.50, Michigan furnace, or $33.54, New York. Some Southern iron is being delivered at New Jersey points on a basis of $17, Birmingham, or $26.37, delivered. No large sales in this territory are reported, but there is a fair amount of spot business. Some inquiry is being put out for the last half of the year and some furnaces are quoting slightly lower for that delivery than for early delivery.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$28.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	27.02
Buffalo, sil. 1.75 to 2.25	28.46
No. 2 Virginia, sil. 1.75 to 2.25	28.56

Ferroalloys.—Demand for ferromanganese is still confined to small lots for early delivery at prevailing quotations, the market being generally quiet. Imports are increasing and there is evidence that they will become still larger. Official data show that the quantity imported in March was 3819 tons, which contrasts with an average in 1921 of only 755 tons per month. Most of the business being done is apparently being taken by British representatives. The spiegeleisen market is moderately active at prevailing prices, sales being confined to small lots. There appears to be no demand for manganese ore, quotations for which are nominal; ore imports are light, those for March having been 15,124 tons. Conditions in the 50 per cent ferrosilicon market and in the ferrochrome market are practically unchanged from those obtaining last week. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, seaboard, per ton	$70.00
Ferromanganese, British, seaboard, per ton	$65.00
Spiegeleisen, 16 to 19 per cent, furnace, per ton	$34.00
Spiegeleisen, 20 per cent	$35.00
Ferrosilicon, 50 per cent, delivered, per ton	$57.00 to $60.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$4.00
Ferrocarbontitanium, 15 to 18 per cent, net ton	$200.00
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$220.00
Ferrocarbontitanium, 15 to 18 per cent, less than 1 ton, per ton f.o.b. Niagara Falls, N. Y.	$250.00

Ores

Manganese ore, foreign, per unit, seaboard	25c. to 26c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.00 up
Chrome ore, basis 48 per cent Cr_2O_3, crude, per unit, Atlantic seaboard	40c. to 45c.
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	40c. to 45c.

Finished Iron and Steel.—Except for structural steel, which continues active, the local steel market seems to have quieted, following the wave of buying by consumers who desired to fortify themselves against a possible shortage due to the coal strike. The volume of inquiry is good but mills are discriminating where they can make desired deliveries. With most of the independent steel companies quoting 1.60c, Pittsburgh, on plates, shapes and bars, only very urgent business is being placed and the orders for small lots for early shipment predominate. Although most producers are quoting 1.60c., Pittsburgh, on the three heavy tonnage products, it is apparent that 1.50c. can still be done on certain specifications, particularly on plates. One company making structural shapes is quoting 1.65c. to 1.70c., Pittsburgh, and has taken orders at these figures. Deliveries are becoming more extensive. Plates can be obtained for almost immediate shipment, but on shapes some mills cannot promise shipment in less than two or four weeks; on bars mills are quoting from four to eight weeks, and one mill has put its price at 1.75c, Pittsburgh basis; on wire products at least four weeks, and on sheets anywhere from a month to two months. Some sheet mills are declining all further business for second quarter. The same cautious policy of booking business that has prevailed in the past two or three weeks continues. Mills are receiving inquiries from consumers to whom they have never sold, indicating that some buyers are finding it difficult to get steel from their regular sources of supply. Structural steel lettings for the week total fully 25,000 tons, and projects soon to be closed aggregate 15,000 to 20,000 tons additional. The week's lettings include the following:

Office building for Grand Central Realty Co., Park Avenue from Forty-sixth to Forty-seventh street, New York, 5000 tons, to George A. Just Co.

Keith's Theatre and Office Building, Brooklyn, 2000 tons, to George A. Just Co.

Girard Street piers, Philadelphia, Triest Contracting Co., general contractor, 6000 tons, to Bethlehem Steel Bridge Corporation.

Extension to boiler house of Boston Elevated Railroad, 600 tons, to Shoemaker-Satterthwait Co.

Office building for Washington Square Realty Co., Philadelphia, 600 tons, to Belmont Iron Works.

Union Electric Light & Power Co. plant, at East St. Louis, Ill., 2300 tons, to Fort Pitt Bridge Works.

Bridge over the Altamaha River in Georgia, 250 tons, to American Bridge Co.

Additional bridge work for the Lehigh Valley Railroad, 600 tons, to American Bridge Co.

Chelsea Bridge at Chelsea, Mass., 1000 tons, to the Boston Bridge Works.

Public School No. 102 at Elmhurst, Long Island, 250 tons, to Bethlehem Fabricators, Inc.

Two apartment houses at Riverside Drive and 102d Street, New York, totaling 1900 tons, to Hinkle Iron Co.

Apartment building in Prospect Park section of Brooklyn, 1000 tons, to National Bridge Works.

Apartment building at Park Avenue and Seventy-third Street, New York, John Lowry, builder, 1000 tons, to Bethlehem Fabricators, Inc.

Apartment hotel in Brooklyn, 1000 tons, to Lehigh Structural Steel Co.

Apartment house in New York, 300 tons, to Weatherly Steel Co.

New pavilion for Roosevelt Hospital, New York, 800 tons, to Hay Foundry & Iron Works. (Reported last week as having been awarded to Levering & Garrigues Co.)

Greenwich Savings Bank, Thirty-seventh Street, New York, 1000 tons, to Hedden Iron Construction Co.

New projects include the following:

Hotel Harmon, Brooklyn, 1900 tons.

Thomas Jefferson School in Brooklyn, 2200 tons.

Prudential Life Insurance Building, Jersey City, probably 3000 tons; bids for steel not yet requested.

Brooklyn Municipal Building, probably 2000 tons; bids for steel not yet requested.

Four bridges for the Baltimore & Ohio Railroad, 350 tons.

New York County Court House, 8000 to 9000 tons; bids closing early in June.

The New York Central Lines last week opened bids on 24,800 tons of heavy rails and awarded orders as follows: Lackawanna Steel Co., 10,100 tons; Illinois Steel Co., 5400 tons; Carnegie Steel Co., 3000 tons; Cambria Steel Co., 3000 tons; Inland Steel Co., 2000 tons; Bethlehem Steel Co., 1300 tons. The Texas Co. came into the market on Saturday for 4000 tons of line pipe. The Erie Railroad has ordered 6000 kegs of railroad spikes. Spikes are now firm at 2.15c. per lb., Pittsburgh. One of the weakest of steel products is cold finished bars, which are quoted at 1.90c, Pittsburgh, but this price is occasionally being shaded. Only a few makers of sheets have put the new prices into effect and sheets are still obtainable at 2.40c. for blue annealed, 3.15c. for black and 4.15c. for galvanized, base, Pittsburgh. Bar iron is now quite firm at 1.50c., Pittsburgh, and small sizes are quoting at least $1 a ton higher.

We quote for mill shipments, New York, as follows: Soft steel bars, plates and structural shapes, 1.88c. to 2.08c.; bar iron, 1.88c. On export shipments the freight rate is 28.5c. per 100 lb. and the domestic rate is 38c.

Warehouse Business.—In a majority of cases, April was as satisfactory a month with warehouses as March and some report a slight improvement over the previous month's business. The recently revised prices on iron and steel are being adhered to strongly and the sheet market is showing greater evidence of strength than for some time. While 4.25c. per lb. for black and 5.25c. per lb. for galvanized are the schedule, upon which warehouses in this district are generally selling, a reduction for lots of 25 bundles or more is quoted in most instances. Some warehouses are quoting 4.10c. per lb. and 5.10c. per lb. for both small and large lots. The brass and copper warehouses report better activity in April than in previous months, but prices on brass

products are off from ¼c. to ½c. per lb. Dealers in wrought iron and steel pipe note a stiffening of quotations and a greater tendency to adhere to the established price schedule. Better business in pipe is also reported during the past month. We quote prices on page 1268.

High Speed Steel.—This market continues unchanged. Producers are of the opinion that at present quotations, high speed steel has reached its low point and that any further change will probably be up rather than down. Considering increased costs of to-day, current prices on 18 per cent tungsten high speed steel are believed to be practically equivalent to the pre-war price. Quotations are from 75c. to 80c. per lb. with special brands of some companies quoted up to 95c. per lb.

Cast Iron Pipe.—Although few municipal lettings are reported, the market is active with the numerous purchases by private corporations. Foundries are operating well up toward 100 per cent capacity and prices are strong. One large maker in this district is unable to promise better than about two months delivery on orders. With demand exceeding the supply and pig iron rising, pipe makers look forward to an early increase in prices. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $48.80; 4-in. and 5-in., $53.50; 3-in., $63.80, with $4 additional for Class A and gas pipe.

Coke.—Prices continue to advance and the usual quotations on foundry grades range from $6.75 to $7.25, but most foundries are well supplied and transactions are few. By-product coke is $8.50, seaboard, with freight from Newark, N. J., of $1 on the Erie and Lackawanna, $1.68 on the Pennsylvania and $2.24 on the Central of New Jersey.

Old Material.—The tendency is still upward, with a fair estimate of the market on heavy melting steel, $9.75 to $10.25 per ton. The buying price on both short length steel rails and rerolling rails is $11.50 to $12 per ton. The latter part of the past week has been quiet, but is looked upon as only a temporary lull in activity. A recent sale in the Pittsburgh district of short length rails is reported at $17.50 per ton.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$9.75 to $10.25
Steel rails, short lengths, or equivalent	11.50 to 12.00
Rerolling rails	11.50 to 12.00
Relaying rails, nominal	27.00 to 28.00
Steel car axles	11.50 to 12.00
Iron car axles	19.00 to 20.00
No. 1 railroad wrought	11.00 to 11.50
Wrought iron track	10.50 to 11.00
Forge fire	7.00 to 7.50
No. 1 yard wrought, long	10.50 to 11.00
Cast borings (clean)	7.00 to 7.50
Machine-shop turnings	6.50 to 7.00
Mixed borings and turnings	6.50 to 7.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.25 to 9.75
Stove plate	9.75 to 10.25
Locomotive grate bars	10.50 to 11.00
Malleable cast (railroad)	9.00 to 9.50
Cast-iron car wheels	12.00 to 12.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	18.00 to 19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	13.50 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to 12.00

Contracts for the $1,000,000 12-story factory, warehouse and office building and for the transfer and completion of its power plant, have been let by the Belknap Hardware & Mfg. Co., Louisville, to the Struck Construction Co., Louisville. The main building will have 747,000 sq. ft. of floor space. The power plant will be equipped with 1200 hp. boilers, 800 kw. turbo-generators, automatic coal and ash handling machinery and rail connections.

The Pittsburgh Steel Co. reports gross earnings for the nine months ended March 31, of $10,390,957, as compared with $20,154,531 in the same period last year. Net profits were $208,286 aganist $1,383,766 in 1921.

Philadelphia

PHILADELPHIA, May 2.

The tenseness of the situation in steel and pig iron, due to the coal strike, has eased somewhat within the past week. Demand from consumers, who have mostly covered their requirements for the immediate future, has slackened, and on the part of producers there is less anxiety as to operations. The supply of blast furnace coke has become slightly better and the eastern Pennsylvania furnaces which were temporarily out of the market because of fear that they might not get sufficient coke to operate are now selling again, but at prices that are approximately $23.50 to $24, furnace, for No. 2 plain and $24 to $25, furnace, for No. 2X. Steel prices are firmer, plates, shapes and bars being quoted by practically all independent producers at 1.60c., Pittsburgh, and in some instances 1.70c. has been quoted and paid by buyers for small lots.

A significant development is the larger demand for plates, which have been laggards among all steel products. The Lukens Steel Co. now has eight of its 22 open-hearth furnaces on and is operating two of its plate mills double turn. The Alan Wood Iron & Steel Co. is operating its plate mill close to 50 per cent and the Midvale, Worth and Central plants are likewise showing slight gains. One plate order placed last week was for 15,000 tons and a number of good-sized inquiries are pending.

Sales of foundry pig iron for third quarter have been made, the latest being 500 tons for shipment to New England at $24, furnace, for No. 2 plain. Basic pig iron has been sold at $23 to $24, furnace, the latter price covering 2000 tons for June-July shipment.

Pig Iron.—The coke situation has eased perceptibly within the past week, causing a correspondingly easier situation in pig iron. Blast furnaces which were in doubt as to how long their coke supply would hold out are now getting regular shipments, with assurance of their continuance unless more coal miners should quit work, and these furnaces are selling more freely. Prices for foundry iron vary, according to the furnace, from $23.50 to $24, furnace, for No. 2 plain; $24 to $25, furnace, for No. 2X, and on No. 1X the prices quoted range from $25 to $26.50, furnace, the latter price being quoted by companies which prefer not to take orders for high silicon iron, which requires more coke to make. Basic pig iron is higher on actual sales. A central Pennsylvania consumer bought 5000 tons at about $23.50, delivered, and a consumer nearer to Philadelphia bought 2000 tons for June-July shipment at $24, furnace, or about $25.25, delivered. Makers of copper bearing low phosphorus iron have advanced its price $2 a ton to $30, furnace. Though furnaces are not anxious to sell for third quarter, they have done so in a few instances at the urgent request of consumers. A sale of 500 tons for shipment to New England in third quarter at $24, furnace, for No. 2 plain is 50c. a ton higher than a sale for the same delivery made about 10 days ago. Eastern pipe companies are again buying iron. A Delaware River cast iron pipe maker has bought 2000 tons of off basic and is understood also to have placed an order for a substantial tonnage with an Alabama furnace. One of the Wharton furnaces of the Replogle Steel Co. will be blown in on May 16 and foundry iron for delivery from this furnace is offered at current market prices by Pilling & Co., Philadelphia, general sales agents. The Midvale Steel & Ordnance Co. will blow in a second furnace at Coatesville on May 22. The Alan Wood Iron & Steel Co. will put one of its smaller furnaces in blast shortly and allow its large furnace to go out.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$24.90 to $25.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.40 to 26.26
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.24
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 28.74
Basic delivery eastern Pa.	23.50 to 25.25
Gray forge	23.00 to 24.00
Malleable	25.50
Standard low phos. (f.o.b. furnace)	30.00
Copper bearing low phos. (f.o.b. furnace)	30.00

Ferroalloys.—British importers closed orders for about 3000 tons of ferromanganese within the past week at $65, Atlantic seaboard, which is $5 below the price quoted by domestic producers, who are taking very little business.

Semi-Finished Steel.—Open-hearth rerolling billets have been sold at $31, Pittsburgh, and higher, and it is doubtful whether they can now be obtained at lower than $31. Forging billets are quoted from $34.50 to $36, Pittsburgh.

Plates.—A larger volume of plate business is coming to Eastern plate mills, and operations are showing a gradual increase. One order placed last week was for 15,000 tons and numerous smaller orders are being entered. While some of the plate tonnage now being booked is at lower than current market prices on protections given early in April, the minimum on all new business, so far as independent producers are concerned, is 1.60c., Pittsburgh, while on small lots as high as 1.70c. has been paid. James Stewart & Co., New York, are inquiring through fabricators for 6000 tons of sheared and universal plates and an equal tonnage of shapes, said to be for New York subway construction. The New York Shipbuilding Co. has asked for prices on 6000 tons of plates and shapes, and the Merchants' Shipbuilding Corporation, Chester, is inquiring for 3000 tons of plates and shapes for a freighter. The Baldwin Locomotive Works has placed orders for about 1200 tons or more of steel for new locomotive orders, which include 20 from the Atlantic Coast Line and 25 from Patagonia. We quote sheared plates at 1.50c. to 1.60c., Pittsburgh.

Structural Material.—Several apartment houses in Philadelphia are being figured on by local fabricators, the steel aggregating several thousand tons. The 2000 tons required for the Miller, Rhodes Co. department store in Richmond, Va., will be fabricated by the American Bridge Co. The University of Pennsylvania stadium, which was designed for structural steel, has been changed to concrete construction. Demand for plain material has shown a slight falling off, but a good deal of building work is in prospect and the lull is believed to be only temporary, due to the stiffening of prices. Quotations on plain material range from 1.60c. to 1.70c., Pittsburgh, the latter price being named by at least two mills on anything but the most attractive tonnage.

Bars.—Steel bars are firm at 1.60c., Pittsburgh, and the mills are taking new orders very sparingly. Consumers whose regular sources of supply are wholly or partially closed to them are finding it difficult to persuade other mills, from which they have not bought regularly, to take the business. Eastern makers of bar iron have advanced prices $2 a ton, now quoting 1.60c., Pittsburgh, for carload lots or larger, and 1.70c. for less than carload lots.

Warehouse Business.—Local warehouses have advanced prices on bars and small shapes, plates, black and galvanized sheets, structural shapes, hoops and bands and tire steel. We now quote for local delivery as follows:

Soft steel bars and small shapes, 2.46c.; iron bars (except bands), 2.36c.; round edge iron, 2.55c.; round edge steel, iron finish, 1½ x ½ in., 2.55c.; round edge steel planished, 3.30c.; tank steel plates, ¼-in. and heavier, 2.56c.; tank steel plates, 3/16-in., 2.72c.; blue annealed steel sheets, No. 10 gage, 3.40c.; black sheets, No. 28 gage, 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.56c.; structural shapes, 2.56c.; diamond pattern plates, ¼-in., 4.35c.; 3/16-in., 4.50c.; spring steel, 3.50c.; round cold-rolled steel, 3c.; squares and hexagons, cold-rolled steel, 3.50c.; steel hoops, No. 13 gage and lighter, 3.21c.; steel bands, No. 12 gage to 3/16-in., inclusive, 2.96c.; iron bands, 3.90c.; rails, 2.36c.; tool steel, 8c.; Norway iron, 5.50c.; toe calk steel, 4.50c.; tire steel, 2.65c.; planished tire steel, 3.40c.

Sheets.—Although some mills in the Pittsburgh-Youngstown district are quoting prices which are $7 a ton above the current market level, this is being done to discourage business, as these mills have committed themselves as heavily as they care to for second quarter. The prices they are quoting are 2.75c. for blue annealed, 3.50c. for black and 4.50c. for galvanized, base, Pittsburgh. At least one carload lot of galvanized sheets has been sold at 4.50c., but this is unusual. Other mills continue to book orders at 2.40c. for blue annealed, 3.15c. for black and 4.15c. for galvanized, base, Pittsburgh.

Track Supplies.—The Pennsylvania Railroad has placed orders for 2000 kegs of railroad spikes and 70,000 heat-treated track bolts. Prices on railroad spikes range from 2.15c. to 2.25c. per lb., Pittsburgh.

Old Material.—Though there is very little demand for heavy melting steel in the Eastern district, except for the plants of the Bethlehem Steel Co., the demand for other grades of old material continues to improve and prices are moving to higher levels. Advances on No. 1 railroad wrought, bundled sheets for steel works, machine shop turnings for steel works and rolling mill use, cast borings for steel works and rolling mills, No. 1 cast and wrought iron and soft steel pipe are in effect this week. We quote for delivery at consumers' works in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$14.50 to $15.00
Scrap rails	14.50 to 15.00
Steel rails, rerolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	20.50 to 21.00
Cast iron car wheels	16.00 to 16.50
No. 1 railroad wrought	16.50 to 17.00
No. 1 yard wrought	15.00 to 15.50
No. 1 forge fire	12.00 to 12.50
Bundled sheets (for steel works)	12.50 to 13.00
No. 1 busheling	13.50 to 14.50
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	12.00 to 12.50
Mixed borings and turnings (for blast furnace use)	11.00 to 11.50
Machine-shop turnings (for steel works use)	12.50 to 13.00
Machine-shop turnings (for rolling mill use)	13.00 to 13.50
Heavy axle turnings (or equivalent)	13.00 to 14.00
Cast borings (for steel works and rolling mills)	13.00 to 13.50
Cast borings (for chemical plants)	15.50 to 16.00
No. 1 cast	18.00 to 18.50
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	14.50 to 15.00
Railroad malleable	12.50 to 13.00
Wrought iron and soft steel pipes and tubes (new specifications)	14.50 to 15.00
Shafting	19.00 to 20.00

Cleveland

CLEVELAND, May 2.

Iron Ore.—Buyers and sellers are still awaiting action on ore freight rates, the latter following the previous announced policy of not naming prices until an announcement comes from the Interstate Commerce Commission in regard to the expected reduction in rail rates. A few small lot sales of ore have been made subject to whatever prices are named and some consuming interests have made contracts on the same basis with mining companies in which they are interested. One ore firm has sold approximately 130,000 tons of lump ore for open-hearth purposes based on 1922 prices, these sales including a 25,000-ton lot. Sales of this ore are in small lots and the total amount purchased is regarded as large. Three ore cargoes have reached Lake Erie ports, the first shipment of the season arriving late last week. April shipments from upper lake ports were 124,779 tons, these figures including cargoes that were loaded April 30. The Steel Corporation has not started any of its boats and some of the independent shippers have made no plans for getting their freighters in commission. The large Newport mine in the Gogebic range, which resumed operations last week, has placed in effect the Steel Corporation wage scale, and this is expected to have an effect on the wage situation in the mining districts. Some of the independent mining companies have already had under consideration a wage advance. Figures compiled by the Lake Superior Iron Ore Association show the total amount of ore on hand at furnaces and at Lake Erie docks, April 1, was 28,150,666 tons, as compared with 29,290,846 tons on the same date a year ago. Furnace stocks on April 1 amounted to 20,469,903 tons. During March, 3,607,451 tons of ore was consumed, as compared with 2,505,702 tons in February and with 2,290,581 tons in March, 1921.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The market was quieter during the past week than during the previous two or three weeks, owing evidently to the fact that most consumers had previously placed orders for the second quarter requirements. However, there is still considerable activity and prices on all grades have further advanced. Foundry iron is now quoted at a minimum of $22 by lake and Valley furnaces, but $23 is the more general quotation. One local producer is quoting $22.50 to $23 and another has advanced its prices to $23 for early shipment and for the third quarter. With this one exception, Northern furnaces are not quoting beyond the second quarter. Basic iron is held at $24 to $25, Valley, with no sales or inquiries reported. Bessemer iron has advanced $2 to $24 and a further advance to $25 may be made. Low phosphorus iron has been marked up $1 to $32, 300 tons being sold at that price. Southern iron has advanced 50c. to $17 and silvery another dollar. Bessemer iron is very scarce and there is a scarcity of various special analysis irons. A carload lot of high silicon malleable iron brought $23.50 and with the freight cost the Cleveland buyer $26.02. One lake furnace reports sales aggregating 9000 tons during the week in lots of 500 tons and under, mostly at $22, and other sellers booked a fair volume of orders. Sales of Southern iron aggregating 5000 tons are reported in this territory at $16.50. These include a 1000-ton and two 500-ton lots taken by a Cleveland consumer for the third quarter. At this price, Southern iron costs less delivered at many northern Ohio points than Northern iron, and some of the sales have been due to the lower price. April shipments are generally larger than during March. The Bourne-Fuller Co. blew out its Upson blast furnace Aprii 30 because of lack of coke. A furnace has sold 300 tons of Bessemer iron at $24, furnace.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations except basic are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic, Valley furnace		$24.00
Northern No. 2 fdy., sil. 1.75 to 2.25	22.50 to	23.00
Southern fdy., sil. 1.75 to 2.25		23.67
Ohio silvery, sil. 8 per cent		33.86
Standard low phos., Valley furnace		32.00

Semi-Finished Steel.—A local mill has sold 2000 tons of sheet bars at $34.25, but it is doubtful whether any can be had now under $35. A Valley mill turned down an offer at the latter price for 1000 tons. Slabs are quoted at $34.50. The McKinney Steel Co. resumed operations at its steel plant May 1, starting six open-hearth furnaces.

Finished Iron and Steel.—The demand for finished material continues fairly heavy and prices have further stiffened. The leading interest is now generally quoting steel bars, plates and structural material at 1.60c., going to 1.50c. only in some cases for large orders. Several of the independent mills are either entirely out of the market or are booking only very limited tonnages. Aside from the leading interest, the former market prices have pretty much disappeared. Some mills, able to make quick shipment, are charging premium prices. Deliveries are slowing down, the leading producer now making shipments in eight to ten weeks on steel bars and four to six weeks on structural material. This interest booked a larger tonnage at its Cleveland office than the monthly average for the past 10 years. Orders placed during the week held up in numbers, but they were somewhat smaller in size than they have been. While some consumers are in need of material and are crowding the mills for deliveries, most buyers are well supplied for the present. The leading interest is now generally accepting a minimum of five tons of size in a mill order instead of one ton as heretofore. Local and Eastern mills are booking boiler and other high grade plates at 1.75c., but buyers are not inclined to pay above 1.60c. for tank steel, although small orders of light plates have brought 2.25c. Hard steel bars have advanced $2 per ton to 1.60c. The demand has improved, as some consumers are substituting hard steel for soft steel bars because of better deliveries and some demand has developed from the implement trade. The Carnegie Steel Co. has taken 600 tons of plates for a 2000-ton boat for the Great Lakes Towing Co. Two large freight boats are still pending. This interest will also supply 3500 tons of plates for the steel pipe for the Cleveland Water Works extension. In structural lines, the Forest City Steel & Iron Co. has taken 600 tons for the Alcazar Hotel and the Riverside Bridge Co. has taken 150 tons for a store building for the Euclid-Thirtieth Realty Co., both in Cleveland. It has developed that the 1100 tons recently placed for the Fenway Hotel, Cleveland, was taken at the low price of $48.90 per ton delivered. Several new inquiries have come out for round tonnages. These include 600 tons of structural steel for an apartment building in Cleveland; 1000 tons of plates for tank work and 800 tons for car repair work; 1750 tons of structural material for New York Central, Pennsylvania and Baltimore & Ohio railroads and miscellaneous bridge work and 3000 tons for other bridge work. The Standard Oil Co. has placed 30 stills requiring 1500 tons of plates and will take new bids for 20 additional stills.

Jobbers quote steel bars, 2.31c.; plates and structural shapes, 2.41c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 3.90c.; No. 28 galvanized sheets, 4.90c.; No. 10 blue annealed sheets, 3.15c. to 3.21c.; hoops and bands, 2.81c.; cold-rolled rounds, 3c.; flats, squares and hexagons, 3.50c.

Sheets.—While most consumers are covered by old prices, a fair volume of business has been taken at 3.15c. for black, 2.40c. for blue annealed and 4.15c. for galvanized sheets. There is considerable new demand from the automobile and steel barrel manufacturers. A local mill has booked considerable business in automobile body sheets at 4.50c.

Warehouse Business.—Cleveland warehouses have advanced sheet prices $3 per ton to cover the recent advance in mill prices. The leading steel jobber had previously advanced blue annealed sheets. Warehouse sales are fairly heavy. The leading interest reports 85 per cent gain in warehouse business in April over March.

Old Material.—Prices have further advanced 25 to 50c. a ton on a number of grades and as much as $1 per ton on a few grades and are very firm. There is little buying by the mills except in small lots, but there is considerable activity between dealers who are covering on short sales. While the supply is plentiful, owners are inclined to hold their scrap because of the advancing market and consequently not a great deal is being offered. Cast scrap has felt the effect of the stiffening in pig iron prices and has advanced with the steel making grades.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$14.25 to $14.75
Steel rails, under 3 ft	15.25 to 15.50
Steel rails, rerolling	15.00 to 15.50
Iron rails	14.00 to 15.00
Iron car axles	18.00 to 19.00
Low phosphorus melting	15.50 to 16.00
Cast borings	11.25 to 11.75
Machine shop turnings	11.00 to 11.50
Mixed borings and short turnings	11.25 to 11.75
Compressed steel	12.00 to 12.25
Railroad wrought	14.00 to 14.50
Railroad malleable	15.00 to 15.50
Light bundled sheet stampings	10.00 to 10.25
Steel axle turnings	12.00 to 12.25
No. 1 cast	16.50 to 17.00
No. 1 busheling	10.50 to 11.00
Drop forge flashings over 10 in	11.00 to 11.50
Drop forge flashings under 10 in	11.25 to 11.75
Railroad grate bars	14.00 to 14.50
Stove plate	14.00 to 14.50
Pipes and flues	11.00 to 11.50

Bolts, Nuts and Rivets.—The improvement in the demand for bolts and nuts is holding up, orders coming from jobbers and all classes of consuming interests, including the agricultural implement manufacturers, who have not been buyers for a long time. Prices are firm at the recent advance. The leading Cleveland rivet manufacturer advanced prices May 1 $1 per ton to 2.25c. for structural and 2.35c. for boiler rivets for carloads, and is asking $2 to $3 per ton higher for small lots. The same maker advanced small rivets to 70, 10 and 10 per cent off list.

Coke.—There is a considerable demand for foundry coke for early shipment, but the supply of Connellsville coke is very scarce. Sales of coke on track are reported at $7. One producer is booking orders at $6.25 to $6.50 without making definite assurance of shipments. Sales of Wise County foundry coke, including a 2000 ton lot, are reported at $6. One pro-

ducer is accepting orders only for the remainder of the year.

The Hydraulic Steel Co., Cleveland, is negotiating for the sale of the plant of the Canton Sheet Steel Co., Canton, Ohio, which is owned by the Hydraulic company. The Canton works includes a steel and sheet mill plant which has not been operating for some time. Plans for resumption have recently been given up.

Boston

BOSTON, May 2.

Pig Iron.—Little business was transacted in this territory the past week, most foundries in the market for important tonnages holding back due to a further stiffening in values. The Sullivan Machinery Co., Claremont, N. H., and the United Shoe Machinery Co., Boston, bought iron, but in the aggregate less than 1000 tons. Other sales largely were in 100-ton lots to car lots at full asking prices. Eastern Pennsylvania, silicon 2.25 to 2.75, sold in a small way at $23.50, furnace, and silicon 2.75 to 3.25 at $24.50, an advance of 50c. a ton, from one furnace, and similar irons at $24 and $25 furnace, respectively, by other furnace interests. Buffalo, silicon 3.25 to 3.75, sold at $25, furnace, which figures out about $23 base, and other high silicon is quoted $1 higher, according to the manganese. Business in Virginia iron last week was confined to small lots of high silicon with special manganese at prices, figured on a No. 2 plain furnace base, showing advances of about $1 a ton. Alabama, stored at Providence, R. I., is offered in competition with other brands, and is the cheapest iron available to-day, due to low water rates. With a base of $16.50 to $17, Alabama furnace, and a water rate around $8, this iron costs around $24.75 on cars, Providence. A sale of Buffalo spiegeleisen at $35, furnace, is noted this week. Charcoal iron the past week sold in Connecticut at about $24, furnace base, with a freight rate of $9.10, making the landed cost about $33.25.

We quote delivered at common New England points as follows, having added to furnace prices $4.06 freight from eastern Pennsylvania, $5.46 from Buffalo, $6.58 from Virginia and $10.66 from Alabama:

East. Pa., sil. 2.25 to 2.75	$27.56 to $28.56
East. Pa., sil. 1.75 to 2.25	27.06 to 28.06
Buffalo, sil. 2.25 to 2.75	28.96 to 29.96
Buffalo, sil. 1.75 to 2.25	28.46 to 29.46
Virginia, sil. 2.25 to 2.75	29.58 to 30.58
Virginia, sil. 1.75 to 2.25	29.08 to 30.08
Alabama, sil. 2.25 to 2.75	27.66 to 28.16
Alabama, sil. 1.75 to 2.25	27.16 to 27.66

Warehouse Business.—Local warehouse prices on soft steel bars, steel flats, concrete bars, structural steel, hoop steel and refined iron have been advanced 10c. per 100 lb. Those quoted on steel bands are firmer inasmuch as inside prices are about 10c. per 100 lb. higher. Otherwise prices remain as heretofore. The demand for iron and steel from local stocks is only fair at best, but nevertheless slightly better than last week. Individual orders continue for small amounts. Some local jobbers have marked up bolts, nuts and machine screws approximately 10 per cent, but others remain on their former price basis, because, as they say, they desire to wait until business is closed on tonnages already quoted on before making the change. Although mill prices on wire nails were advanced some time back, no change is noted in local jobbing quotations.

Jobbers quote: Soft steel bars, $2.50½ per 100 lb. base; flats, $3.15½; concrete bars, $2.50 to $2.78; structural steel, $2.50½ to $2.60½; tire steel, $3.85 to $4.25; open-hearth spring steel, $4 to $5.50; crucible spring steel, $11.50; steel bands, $3.00½ to $3.53; hoop steel, $3.41½; cold rolled steel, $3 to $3.50; refined iron, $2.50½; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $5.50; plates, $2.65½ to $2.83; No. 10 blue annealed sheets, $3.48 per 100 lb. base; No. 28 black sheets, $4.65; No. 28 galvanized sheets, $5.65.

Finished Iron and Steel.—The Boston Bridge Works will fabricate the 1000 tons of structural steel to be used in the Boston-Chelsea bridge. The Lackawanna Steel Co. is awarded approximately 200 tons of sheet piling for the same job. The Eastern Bridge & Structural Co., Worcester, Mass., is awarded 250 tons of structural steel for the Central Supply Co., Worcester, building, and 225 tons for the Turner Center Creamery, Providence, R. I., building; the New England Structural Co., Everett, has 125 tons for a Boston garage; and the Boston Structural Steel Co., Inc., Cambridge, 125 tons for the Fisk building, Cambridge. The last named firm was the low bidder on 372 tons of structural steel wanted by the Boston Transit Commission, 1 Beacon Street, Boston. The Boston & Maine Railroad has bought 20,000 pairs of angle bars from the Lackawanna Steel Co. and 6800 from a Pennsylvania maker. The Eastern Massachusetts Street Railway has purchased approximately $50,000 of special track work, and the United Electric Railways, Providence, R. I., about $20,000, the Bethlehem Steel Co. getting the bulk of the business. Springfield, Mass., street railway interests are inquiring on about $50,000 such work, and a Maine railway on about $5,000. Eight hundred tons of steel plates last week were loaded at the Bethlehem Shipbuilding Co., Ltd., Fore River Works, Quincy, for shipment to the Far East. The same steamer took machinery and wire, bringing the total finished iron and steel bookings up to 1200 tons. A large shipment of textile machinery also left this port last week for China. The Central New England Railway has purchased 20 heavy switching engines of the 0-4-0 type.

Coke.—In announcing their May schedules, both the New England Coal & Coke Co., Boston and Everett, and the Providence Gas Co., Providence, R. I., made no change in prices for by-product foundry coke for that month. Both quote contract delivered fuel at $10.25 delivered, where the local freight does not exceed $3.40 a ton, and spot delivered coke at $10.50. Shipments of foundry coke from these plants during April were 60 to 70 per cent of those for the preceding month. Larger shipments than previously were anticipated are expected in May because of the increasing activity of foundries. At the moment, malleable foundries are going ahead faster than gray iron, most of them working the full six day week and with practically a full molding crew.

Old Material.—Further shipments of old materials on contracts placed previously in this territory, together with new tonnages booked, gave the market a decidedly more active appearance the past week. Shipments of heavy melting steel are not confined to Pennsylvania, however, New England users taking round tonnages for which dealers have paid slight premiums over material intended for elsewhere. The market for this class of scrap is all of 50c. a ton higher than a week ago, and tending upward. Next to heavy melting steel, shafting has enjoyed the best call. Brokers paid $13 to $14 shipping point for such, and can take additional tonnages, these prices representing an appreciation of about $1 a ton. Turnings have sold at a wide range recently, due to the spread of freight rates to points of consumption. For instance, some brokers paid $6.50 shipping point, others $6.75, others $7 and still others $7.10. Where the higher prices were paid, the metal is intended for nearby points where electric furnaces are used. Chemical interests want cast iron borings, but will not pay going prices. They say they can buy for less money in New Jersey. Cotton ties have been taken at $6 New England shipping points, and the demand for pipe at $8.50 to $9 a ton f.o.b. cars, representing an advance of 50c. a ton, is more active. The demand for machinery cast is limited. A South Boston melter last week bought 100 tons heavy scrap, ex-vessel (dismantled) at $16 per net ton on cars. Scattered lots of textile machinery at $18.50 delivered, or close to that price, are noted as sold.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery	$18.00 to $18.50
No. 2 machinery	16.00 to 16.50
Stove plate	14.50 to 15.00
Railroad malleable	13.00 to 13.50
Car wheels	17.00 to 17.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	10.50 to 11.00
No. 1 railroad wrought	11.00 to 12.00
No. 1 yard wrought	10.00 to 10.50
Wrought pipe (1 in. in diam., over 2 ft. long)	8.50 to 9.00
Machine shop turnings	6.50 to 7.00
Cast iron borings, rolling mill	7.00 to 7.50
Cast iron borings, chemical	9.50 to 10.00
Blast furnace borings and turnings	6.50 to 7.00
Forged scrap and bundled skeleton	5.50 to 6.00
Street car axles	12.50 to 13.00
Shafting	13.50 to 14.00
Rerolling rails	10.50 to 11.00

St. Louis

ST. LOUIS, May 2.

Pig Iron.—The week was marked by heavy purchases of pig iron, the largest of these being 10,000 tons of basic for a West End melter. This purchase was equally divided between the Granite City maker and a Birmingham maker. Various other melters in the district bought around 4000 tons. One Iowa melter bought 900 tons, while others in that state took between 500 and 700 tons. A Sheffield maker sold about 1200 tons during the week, most of which was for water and rail shipment. A local car wheel maker bought 450 tons of foundry wheel iron. Negotiations are pending for the purchase of between 10,000 and 15,000 tons by two leading companies in the district. The market is firm at $16.50 to $17 Birmingham for Southern iron, for shipment through May and June, with an additional 50c. a ton for third quarter delivery. The lower price is quoted by a Sheffield maker. Northern iron is strong at $21 Chicago. Consumers of pig iron are taking on more business, and are much freer buyers of material. The report of the St. Louis Federal Reserve Bank states that steel rolling mills, foundries and machine shops report the placement of more new business than has been the case in 18 months, that specialty makers have participated in the general improvement and that seven reporting stove manufacturing interests showed sales in March from 15 to 102 per cent larger than February.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$23.80
Northern malleable, sil. 1.75 to 2.25	23.80
Basic	23.80
Southern foundry, all rail, sil. 1.75 to 2.25	$22.24 to 22.74
Southern foundry, water and rail, sil. 1.75 to 2.25, f.o.b. St. Louis	21.24

Finished Iron and Steel.—Buying by railroads is still the center of interest for the iron and steel trade. The principal order of the week was placed by the Wabash Railway, which was for 25 steel passenger cars and placed with the American Car & Foundry Co., St. Charles. Deliveries are to be made in August. Orders for track material include 4000 kegs of spikes and bolts for the Missouri, Kansas & Texas Railway, which went to Illinois Steel Co. and 5000 kegs of spikes and bolts for the Missouri Pacific, which was distributed among three manufacturers. The Wabash wants between 500 and 1000 kegs of the same material. Interest is beginning to be shown in the purchase of cotton ties, and one concern has inquiries for about 30 carloads. Mills are loath to take the business, and they are more discriminating generally in accepting business. An inquiry for 150 gross tons of steel rods developed the fact that the market price of $38 Pittsburgh was too high, quotations of $35 being made. The demand for structural has not manifested itself to any marked degree. Warehouse business is improving considerably.

For stock out of warehouse we quote: Soft steel bars, 2.37½c. per lb.; iron bars, 2.37½c.; structural shapes, 2.47½c.; tank plates, 2.47½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.25c.; structural rivets, $3.09½ per 100 lb.; boiler rivets, $3.19½; tank rivets, 7/16-in. and smaller, 65 and 5 per cent off list; machine bolts, large, 60-10 per cent; small, 60, 10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 65-5 per cent; hot pressed nuts, square or hexagon blank, $4; and tapped, $3.75 off list.

Coke.—With the increase in the volume of business being done by the foundries has come a better demand for foundry grades. The strike of the coal miners has not affected the local by-product furnaces, but the market has been strengthened by lessened production in the Connellsville district because of the strike.

Old Material.—The market for old material is strong, with a very active demand. There is exceptional strength in such items as wheels, couplers and springs. Dealers have been found short on some of these items, and have been forced to sustain losses to cover their requirements. Iron axles and iron wrought bars are very scarce, and there is keen competition for each list that goes out. Dealers are putting their wrought scrap into steel grades. There is a good demand for cast scrap and car wheels. Lists by railroads before the market this week follow: Pennsylvania system, Southwestern region, 5200 tons; Northwestern region, 2900 tons; Missouri, Kansas & Texas Railroad, 600 tons and Chicago, Burlington & Quincy, 5000 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails	$16.75 to $17.25
Steel rails, rerolling	15.50 to 16.00
Steel rails, less than 3 ft	15.50 to 16.00
Relaying rails, standard section	25.00 to 30.00
Cast iron car wheels	17.50 to 18.00
No. 1 railroad heavy melting steel	14.50 to 15.00
No. 1 heavy shoveling steel	13.00 to 13.50
Frogs, switches and guards, cut apart	15.00 to 15.50
Per Net Ton	
Heavy axle and tire turnings	9.50 to 10.00
Steel angle bars	13.50 to 14.00
Iron car axles	23.00 to 23.50
Steel car axles	15.25 to 15.75
Wrought iron bars and transoms	18.00 to 18.50
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	12.00 to 12.50
Railroad springs	15.50 to 16.00
Steel couplers and knuckles	15.50 to 16.00
Cast iron borings	9.00 to 9.50
No. 1 busheling	11.00 to 11.50
No. 1 railroad cast	16.00 to 16.50
Stove plate and light cast	12.75 to 13.25
Railroad malleable	12.00 to 12.50
Pipe and flues	8.50 to 9.00
Machine shop turnings	7.75 to 8.25

Birmingham

BIRMINGHAM, ALA., May 2.

Pig Iron.—May entered with the Birmingham iron market on a base of $17 to $17.50, iron being sold at both figures. The $16.50 price disappeared during the last week of April when one maker turned down firm offers of as high as 3500 tons at $16.50, a total of 10,000 tons at that base being refused. The maker with greatest present capacity went out of the market when it was $16.50 and is quoting $17.50 on what it now has to offer on strictly new business. Another maker, who declined to book 20,000 tons for third quarter on a one-furnace make at $17, has since booked a large tonnage at $17.50, taking all that he cared to take at that figure. Lots booked covered a wide territory and one was 1500 tons for Middle Western delivery. The maker slowest to get into the selling game is credited with bookings in the recent past of 80,000 tons and is at minimum of $17. Several lots have been sold into the strictly Eastern territory. The water-borne iron from the Sheffield stack of the Sloss-Sheffield Steel & Iron Co. is moving at the rate of 8000 tons a month. This interest, which blew in a stack at North Birmingham during April, will blow in a second stack at North Birmingham the middle of the month. The Woodward Iron Co. began making foundry iron at Vanderbilt stack last Sunday and during the week began making basic at one of the three active stacks at Woodward for a Middle Western steel company. There are now 18 active stacks in Alabama, nine each on foundry and basic compared with nine Jan. 1. Inquiry is extremely active, especially in the Middle West, which is booking large tonnages. Virginia pipe makers have taken 18,000 tons of Birmingham iron at $16.50. The market gathers strength straight along and further advances seem imminent in view of small stocks on yards.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$17.00 to $17.50
Basic	16.00 to 16.50
Charcoal, warm blast	30.00

Finishing Mills.—The Tennessee company reduced rail making this week to 9000 tons, but other mills maintained capacity pace. The Conners Steel Co. continues at hoop and band mills with growing demand. Wire drawing mills of the American Steel & Wire Co. and Gulf States Steel Co. are around 75 per cent of capacity. Accumulations are gone and consumers wait two to three weeks on deliveries pending manufacture. Wire fencing remains active. Structural steel is very active.

Cast Iron Pipe.—It is stated on good authority that the United States Cast Iron Pipe & Foundry Co. has perfected plans for the manufacture of soil pipe by the De Lavaud process at the abandoned pressure pipe plants at Louisville and Columbus, possibly also at

Cleveland. Anniston is also mentioned as a possible scene of this departure. The Standard Foundry Co., Anniston, on the other hand, has taken over the high pressure plant of the Lynchburg Foundry Co. at Anniston, and is selling high pressure pipe based on resumption of operations there by June 1. The Standard Foundry Co. owns and operates three soil pipe plants. The Hammond-Byrd Iron Co. is selling agent for the Standard company. Fifteen thousand tons of pressure and sanitary pipe, three-fourths of the tonnage being pressure pipe, will have moved out of port of Mobile for the Pacific Coast in six weeks ending the middle of May. It goes to all Pacific ports and destination inland is as far as Nebraskan points. Pressure pipe is on a new base of $35.50 for 100 tons and under and $35 for 100 tons and over. Sanitary pipe is active at $45.

Coal and Coke.—Coke is in active demand and new business is bringing $5.50. Steam coal demand is reduced owing to heavy stocking up.

Old Material.—Scrap dealers are gradually disposing of steel to smaller foundries at $12 to $13 while the largest consumers offer only $10.50. Famine in steel scrap is predicted by yard men in 30 days, after which they expect substantially better prices.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$13.00 to $14.00
No. 1 steel	12.00 to 13.00
No. 1 cast	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	11.00 to 12.00
Stove plate	12.00 to 13.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	4.00 to 5.00

Cincinnati

CINCINNATI, May 2.

Pig Iron.—The market again showed activity during the week. Prices continued to advance, and quotations are now from 50c. to $1 higher. On active buying, Southern iron has advanced to $17 base, for prompt shipment, and with the exception of one furnace, to $17.50 for third quarter. Practically all Southern furnaces are sold up for second quarter, and several of them now in production have withdrawn from the market entirely. While there were no large sales reported, the number of 100 to 200-ton lots was impressive, the result being that the aggregate tonnage booked ran well into five figures. Northern iron was also in fair demand, and foundry grades are at least 50c. higher, with silveries up $1. Sales reported include 1000 tons to a Michigan melter on a $21, Chicago, basis; 600 tons to a central Ohio melter on a $22, Ironton, basis, and 1000 tons of Southern iron on a $16.50, Birmingham, basis. These sales, however, were made early in the week, and since Thursday last practically all bookings have been at the higher prices. Inquiries continue light, nearly all of the business booked nowadays being the result of personal solicitation. We note, however, an inquiry for 1000 tons of charcoal iron from Michigan, 1000 tons of foundry from a northern Ohio melter, and 500 tons of silvery from an Indiana melter. The increased demand for iron is reflected in the number of Southern furnaces getting ready to blow in. Two stacks in Tennessee have already bought coke, and one in the southern Ohio district has arranged for its supply. These furnaces will blow in before the end of the month. One Southern furnace is now quoting its iron at a delivered price, which means that, in case freight rate reductions are made, the benefits will accrue to the furnace.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$21.50 to $22.00
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	22.00 to 22.50
Ohio silvery, 8 per cent sil	33.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	25.02
Basic Northern	23.52
Malleable	25.02

Finished Material.—Results of the coal strike and its interference with mill operations are seen in advances made by several independent companies in prices of sheets. Several mills are now quoting 3.40c. to 3.50c. on black and 4.40c. to 4.50c. on galvanized. However, offerings at the old schedule of 3.15c. and 4.15c. are still to be had, although mill schedules are reported to be about filled for second quarter. A Valley mill has announced its price on plates as 2.25c., but this is taken to mean that its capacity is well sold up, and that this price is an announcement that it is out of the market. Consumers are now seeking to place tonnages for delivery during the third quarter, but to date none of the mills have opened their books for this period. The demand for bars and shapes is almost entirely confined to small tonnages, most of the consumers having contracted for their second quarter needs. Prices, with the exception of sheets, show little change, and on the heavier products 1.50c. to 1.60c. represents the market. Semi-finished materials are very hard to secure, and an inquiry for 1000 tons of billets has not found any mill willing to take on the business. The Big Four Railroad opened bids on its second quarter requirements for track supplies, including 7000 kegs of track spikes, 4500 kegs of track bolts, 30,000 pairs of angle bars and 198,000 tie plates. The low bid on spikes was $2.15, Pittsburgh, and on track bolts, $3.90, Pittsburgh. On angle bars, the Illinois Steel Co. quoted Bessemer bars at 2.655c., f.o.b. Kankakee, and 2.55c., f.o.b. Joliet; on open-hearth bars, its quotation was 2.707c., f.o.b. Kankakee, and 2.607c., f.o.b. Joliet; the Lackawanna Steel Co. quoted Bessemer and open-hearth bars at 2.75c., Cleveland, and the Cambria Steel Co. 2.81c. and 2.76c. for Bessemer and open-hearth respectively, delivered Cleveland. On tie plates, the Dillworth-Porter Co. quoted open-hearth plates at $35 per ton, Pittsburgh, and copper bearing plates at $38 per ton. The Railroad Supply Co. quoted $39, Chicago, on copper bearing plates; the Illinois Steel Co., $39, Gary, with a roll charge of $4,800; Sellers, substituting own plate, at $40, f.o.b. mill; Inland Steel, $36, Indiana Harbor, on its own plate; and Cambria Steel Co., $40.20, Cleveland, with a roll charge of $2,950 on both 90 and 105-lb. plates. The C. I. & W. Railroad is inquiring for 300 freight cars, which will likely be placed within the next week. In the structural field, the Belknap Hardware Co. has awarded a contract to the Struck Construction Co. for the erection of a 12-story warehouse building at Louisville, Ky., which will require approximately 2000 tons of bars. Parks & Co., Chattanooga, are low bidders on the auditorium at Chattanooga, and the Middle States Construction Co., Columbus, Ohio, is low bidder on a highway bridge in Hamilton County which will require approximately 450 tons of steel. Bids closed on April 28 for the Washington Gladden school at Columbus, and on Monday for an addition to the Provident Bank Building at Cincinnati. Estimates are being taken on a 10-story concrete structure for the Atlas National Bank at Cincinnati. Figures will shortly be taken on the municipal auditorium at Memphis, Tenn., involving 3000 tons. The Snowden office building in that city, which was figured recently, will not go ahead for this year at least. Plant operations are increasing steadily, and the American Rolling Mill Co. at Middletown has put in operation four of its emergency mills. This company's finishing capacity is now running 100 per cent. The Whitaker-Glessner Co. at Portsmouth has placed several more mills in operation, and is getting close to capacity operation.

Warehouse Business.—Local warehouses report the demand for steel products is steadily increasing, the past week showing a very fair business. Prices have been advanced, with the exception of cold-rolled products and sheets, $3 per ton. Some jobbers have advanced prices on nails to $2.85 per keg, base, but others are maintaining the old base of $2.75.

Jobbers quote: Iron and steel bars, 2.75c., base; hoops and bands, 3.35c., base; shapes and plates, 2.85c., base; reinforcing bars, 2.82½c., base; cold-rolled rounds, 3.35c.; flats, squares and hexagons, 3.85c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; common wire nails $2.75 per keg, base; No. 9 annealed wire, $2.60 per 100 lb.

Coke.—The coke market is only fairly active, but prices are showing slight advances. Connellsville foundry coke has been sold at $7, and Wise County is up at least 25c. to $5.50, with some sales as high as $6. New River is unchanged at $7.50.

Old Material.—The local scrap market is quiet, although a few inquiries for cast scrap were current during the week. Steel grades are in demand for shipment to outside districts, and as a result prices are slightly higher.

We quote dealers' buying prices, f.o.b. cars:

	Per Gross Ton	
Bundled sheets	$6.50 to	$7.00
Iron rails	13.50 to	14.00
Relaying rails, 50 lb. and up	26.50 to	27.00
Rerolling steel rails	12.00 to	12.50
Heavy melting steel	11.50 to	12.00
Steel rails for melting	11.50 to	12.00
Car wheels	14.00 to	14.50
	Per Net Ton	
No. 1 railroad wrought	11.00 to	11.50
Cast borings	6.00 to	6.50
Steel turnings	4.50 to	5.00
Railroad cast	14.00 to	14.50
No. 1 machinery	16.00 to	16.50
Burnt scrap	9.50 to	10.00
Iron axles	18.00 to	18.50
Locomotive tires (smooth inside)	11.00 to	11.50
Pipes and flues	5.50 to	6.00

Buffalo

BUFFALO, May 1.

Pig Iron.—Rogers, Brown & Co. have sold 70,000 tons of foundry iron of various grades to the American Radiator Co., for use in the Buffalo plants. The consideration is not made known and delivery is to be made over a period of seven months at the rate of 10,000 tons per month. The sale is the largest individual transaction in months and is of especial interest in consideration of the fact that the seller has sold considerable iron the past few weeks and was understood to have but little available. About 9000 tons has been sold by other furnaces and $23 base appears to be the ruling figure with the 50c. differential in effect, while $23.50 is asked for basic iron. Inquiry is brisk and several furnaces have turned down business. There is no likelihood of an increase in furnace operation though the product could be easily sold—on account of coal delivery. On sales of malleable the price was $23.50 and on No. 1X $25.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$24.00
No. 2X foundry, 2.25 to 2.75 sil	23.50
No. 2 plain, 1.75 to 2.25 sil	23.00
Basic	23.50
Malleable	23.50
Lake Superior charcoal	28.14

Finished Iron and Steel.—There is some apparent disposition on the part of a few selling agencies to consider offerings of business—a contrast to the announced withdrawal on all grades of all materials. Prices of 1.60c. on bars, shapes and plates remain firm, however. Operations have been speeded up and one large independent has every department running at normal except the plate mill. This program includes seven open hearths and three bar mills. No effect on the operating program of local mills has been noticed because of the coal situation, but it is generally felt that a change must come before June 1, unless some relief comes. The leading sheet interest is sold up until the end of June at least. Another mill will go in within a few days. The local branch of a national agency is considering sheet inquiry and still another is taking orders for hot-rolled material as it fits into the rolling schedule at the mill. The Lackawanna Bridge Co. will fabricate 2700 tons for the new Genesee Building, Buffalo, the general contract having been awarded to the Turner Construction Co. The same fabricator will fill an order for a paper mill at Newton Falls, N. Y., involving 100 tons for use in a rearrangement of the power plant.

Warehouse Business.—Uncertainty in the schedules of mill operation continues to throw much business to the warehouses and April closed with record tonnages booked. Sheets are especially in good demand and structural steel and plate demand has held up. The fact that the largest local independent is not rolling plates or shapes has helped warehouse business.

We quote warehouse prices, f.o.b. Buffalo as follows: Structural shapes, 2.65c.; plates, 2.65c.; soft steel bars, 2.55c.; hoops, 3.30c.; bands, 3.15c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.40c.; black sheets, No. 28, 4.40c.; cold-rolled strip steel, 5.80c.; cold-rolled round shafting, 3.35c.

Old Material.—Several sales of heavy melting steel have been made at $15, the highest price offered since the beginning of the buying movement. Mills are not apparently anxious to buy large tonnages, however, the general disposition being to supply only immediate needs, not knowing what operation will be in the near future on account of the coal situation. Borings have been in good demand.

We quote dealers asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$14.50 to $15.00
Low phos., 0.04 and under	17.50 to 18.50
No. 1 railroad wrought	16.00 to 16.50
Car wheels	16.00 to 16.50
Machine shop turnings	10.50 to 11.00
Cast iron borings	11.50 to 12.00
Heavy axle turnings	12.50 to 13.00
Grate bars	12.00 to 13.00
No. 1 busheling	12.00 to 12.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	9.00 to 10.00
No. 1 machinery cast	17.50 to 18.50
Hydraulic compressed	12.50 to 13.50
Railroad malleable	13.50 to 14.50

San Francisco

SAN FRANCISCO, April 26.

Pig Iron.—Under conditions prevailing in the foundry and manufacturing trade on the Coast, a good volume of business in pig iron was reported for the past fortnight period, principally the activity of two or three importers and distributors. Around 2500 tons of mixed grades of Southern material have been sold for shipment from Gulf points to various consumers along the Coast. While the prices have not been disclosed, they are said to have been attractive. This does not suggest that the market is in other than a firm condition; in fact, figures less than $26, delivered, for basic pig are seldom heard now, and the more general prices range from around $27.50 to $28.50. There is an inquiry in the market for something between 600 and 700 tons of foundry pig. Birmingham shipments seem to have the preference with buyers at present. The foreign iron situation here is lifeless, there apparently being no interest in these offerings, due to higher prices and more uncertain delivery.

Cast Iron Pipe.—Recent prospects have been rather less notable than those of the previous two or three weeks, but prices maintain their firm position at about $49 to $50, delivered. Both municipal and private business is quiet at this time.

Finished Iron and Steel.—The market continues to show indications of slow improvement, both in regard to volume of business and prices, although conditions are a little spotty yet. Building operations throughout the State are progressing encouragingly, and mills are working on several prospects, mostly of moderate size. The price of merchant bars seems to have worked up slightly higher, the level now being pretty generally considered to be $2.55. The heavier materials, with the possible exception of plates, appear to be holding to the prices quoted at the first of the month; namely, $4.15 for galvanized sheets at tidewater, $2.65 for blue annealed, and $2.40 for black sheets. Plates, however, continue rather unsettled, with quotations ranging from around $1.65, $1.75 to $1.95, tidewater, although the tendency is toward the higher prices. A fair amount of business has been done in this line, perhaps the largest single placement being the 1734 tons of plates for Astoria, Ore. Bolts and nuts have shown approximately a 10 per cent advance recently, large size machine bolts now being 65, 10, and 5 off list.

Coke.—There has been some buying for future delivery of recent date, around 2000 tons of English coke coming forward, a portion of which has been sold. About 2000 tons likewise have been sold for May-June delivery. Higher prices being quoted may have had some effect in stimulating buyers to anticipate their future needs, to some extent, at least. A few orders for domestic coke have also been received. Prices are firm, with the market level around $8.50, f.o.b. ovens.

Old Material.—The same steady consumptive demand continues, which appears to be the sole feature of the market. The local mills are operating their open-hearth facilities in a very restricted way, and are making virtually for immediate requirements only. Prices are unchanged on both cast iron scrap and heavy melting steel.

FAVORS FULL STATISTICS

Federal Trade Commission Answers in Claire Furnace Case

WASHINGTON, May 2.—Argument in the Claire Furnace Co. cost accounting case, which was to be begun yesterday, before the Court of Appeals of the District of Columbia, has been postponed until Monday, May 22.

The Federal Trade Commission which appealed the case from the Supreme Court of the District of Columbia on assignment of errors after losing its contentions in that court, has filed its brief.

It completely surveys the proceedings from their beginning, sets forth the efforts of the commission to get cost figures from the iron and steel industry, and explains the fact that it was enjoined from doing so on a question of jurisdiction. The argument then at length makes legal contentions designed to show that the commission is authorized by Congress to get the information desired and in this connection renews arguments made previously.

The brief brings in some interesting material, however, and connects the case with the present-day discussion of trade associations and the necessity of obtaining impartial statistical data from them and in quoting the decision of the Supreme Court in the Hardwood case, says that it distinguishes between facts gathered and disseminated, which go "to the seller only" and such information gathered and made public through an impartial governmental agency. The brief says that the divergence of opinion of the court as to whether the information in that case was available to the buyer as well as to the seller merely emphasizes the fact that both majority and minority regard such collection and dissemination by any selling association for its own benefits alone, as unfair.

"With the recognition by the entire Supreme Court of such a situation, it would seem that the associations themselves ought to see that their real interest lies in having the Federal Trade Commission, as the proper designated governmental agency, collect, verify, assemble, analyze, and publish to buyer and seller alike the true and complete facts," says the brief.

"This would seem to be particularly true as to the more essential and basic industries. Moreover, with knowledge of what happens when such information is not so disseminated for the benefit of both the selling industry and the purchasing public, it would seem to be particularly the duty of the commission to carry out such activity as to the more basic trades exactly as it sets out to do as to steel and coal."

Claiming that statistics regarding the steel industry should include cost and other information of the most intimate character, the brief bases its reasoning for the necessity of such figures on the fact that the steel industry is basic in character and that information regarding it is of vital importance to the country. It likewise argues for figures regarding coal and coke production in which the steel companies involved in the case are interested.

"Steel is a basic necessity of modern civilization," it is stated. "Without it civilization would revert many centuries. Coal, one of the principal raw materials, is a basic necessity throughout the United States to-day. Without both coal and steel the distribution of all necessities and the wheels of industry would stop. We have, as yet, found nothing capable of entirely supplying their places.

"The source of supply of these basic commodities is limited; their use, constant and universal.

"Based on published reports and figures for 1920, 93 per cent of the iron ore is mined in three States; so that forty-five States with 92 per cent of the population of the United States, are dependent for all above 70 per cent of what they buy, upon ore mined in and shipped from three States. Ninety-one per cent of the pig iron is produced in eight States, so that 40 States, with a population of 49 per cent of the total of the United States, are dependent upon interstate shipments for all they use above 9 per cent. Four States produce 83 per cent of the ingots and castings, so that 44 States, with 77.4 per cent of the population of the United States, are dependent upon interstate shipments for all they use in excess of 17 per cent. Eighty-one per cent of the finished rolled iron and steel is produced in four States, so that 44 States, with 77.4 per cent population of the United States, are dependent upon interstate shipments for all the rolled iron and steel they use in excess of 19 per cent.

Progress in Plans for a New Steel Consolidation

The plans for the merger of seven important independent steel companies appear to be set forward by developments of the past week. Following several days of conferences in New York which were participated in by the heads of most of the companies concerned, a party consisting of chairmen and presidents of the several companies and representatives of the promoting interests started on a tour of inspection of the different steel plants. Among those in the party were: William E. Corey, chairman, and A. C. Dinkey, president, of the Midvale company; John A. Topping, chairman, and Thomas J. Bray, president, of the Republic; J. A. Campbell, president, and C. S. Robinson, vice-president, of Youngstown Sheet & Tube; George F. Downs, president of Lackawanna; F. B. Kennedy, chairman, and James H. Grose, president, of Brier Hill; Clayton Mark, chairman, and Clarence Mark, vice-president, of Steel & Tube, and L. E. Block, chairman, and P. D. Block, president, of Inland Steel.

The Lackawanna Steel Co. plant at Lackawanna, N. Y., was visited on Monday. The next inspections were to be those in the Youngstown district in which are located the plants of the Republic Iron & Steel Co., Youngstown Sheet & Tube Co. and the Brier Hill Steel Co. The remaining days of the ten which the trip is expected to require were to be spent at the plants of the Midvale Steel & Ordnance Co. at Johnstown and Coatesville, Pa., those of the Inland Steel Co. and the Steel & Tube Co. of America in the Chicago district, and finally the Pioneer furnaces and ore properties of the Republic Iron & Steel Co. in the Birmingham district.

As indicated in the original publication of plans for the consolidation made in THE IRON AGE of Dec. 8, 1921, the total ingot capacity of the seven companies is 10,129,000 gross tons, which is about 20 per cent of the ingot capacity of the country. The inclusion of the Bethlehem Steel Corporation in the consolidation, which has been spoken of at various times as a possibility, is not a part of the present plan. If the seven-company consolidation is put through, the addition of Bethlehem may come later. With an eight-company consolidation there would be left outside only two of the larger independent companies—the Jones & Laughlin Steel Co., with a capacity of 5.24 per cent of the country's total, and the Colorado Fuel & Iron Co., whose percentage of the total capacity is 2.26. Other steel companies, including a number of independents with individual capacities running in some cases above 500,000 tons a year, represent an output practically equal to that of the seven companies whose consolidation is proposed. The Steel Corporation and the seven independents represent together about 65 per cent of the country's capacity.

Since April 1, the export business of the Bridgeport Hardware Mfg. Co., Bridgeport, Conn., has recovered to the 1913, or pre-war basis. Orders from Cuba, China, Japan, Australia and India for nail pullers, screw drivers, cutting pliers, automobile tools, etc., have been especially encouraging.

Approximately 100 were added to the payroll of the American Steel & Wire Co., Worcester, Mass., during the past fortnight. Incoming business is on the mend, but is spread over a large number of individual orders, indicating that consumers and wholesale distributors are still inclined to buy cautiously.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.36	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.35	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.405	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Memphis	0.43
Cincinnati	0.325	Jacksonville, all rail	0.555
Indianapolis	0.345	Jacksonville, rail and water	0.46
Chicago	0.38	New Orleans	0.57
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.70c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.70c.

Wire Products

Wire nails, $2.40 to $2.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.25; galvanized wire, $2.75; galvanized barbed wire, $3.05 to $3.15; galvanized fence staples, $3.05 to $3.15; painted barbed wire, $2.55 to $2.65; polished fence staples, $2.55 to $2.65; cement-coated nails, per count keg, $1.90 to $2; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 70½ per cent off list for carload lots; 69½ per cent for 1000-rod lots, and 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 65, 10, 10 and 5 per cent off list
Machine bolts, small, cut threads..65, 10 and 5 per cent off list
Machine bolts, larger and longer...65, 10 and 5 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 65, 10 and 5 per cent off list
Cut threads ..... 65 and 5 per cent off list
Longer and larger sizes..... 65 and 5 per cent off list
Lag bolts ..... 65, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads, 60 and 10 to 60 per cent off list
Other style heads..... 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter..... 65 per cent off list
Larger and longer sizes..... 65 per cent off list
Hot pressed square or hex. blank nuts..... $5.25 off list
Hot pressed nuts, tapped..... $5.25 off list
C.p.c. and t. sq. or hex. nuts, blank..... $5.00 off list
C.p.c. and t. sq. or hex. nuts, tapped..... $5.00 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S....80, 10 and 10 per cent off list
Small sizes, S. A. E., 80 and 3 tens to 80 and 2 tens per cent off list
⅝ in. to 2 in. inclusive, U. S. S..... 80 per cent off list
Stove bolts in packages..... 80, 10, 10 and 5 per cent off list
Stove bolts in bulk..... 80, 10, 10, 5 and 2½ per cent off list
Tire bolts ..... 65, 10 and 5 per cent off list
Track bolts in carloads..... 3c. to 3.50c. base
Track bolts, less than 200 kegs..... 3.50c. to 4c. extra

Upset Square and Hex. Head Cap Screws

½ in. and under.....80 and 10 to 80, 10 and 10 per cent off list
9/16 in. to ¾ in.....80 and 10 to 80, 10 and 10 per cent off list

Upset Set Screws

½ in. and under..... 80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in..... 80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes ..... 75 and 10 to 80 per cent off list

Milled Set Screws

All sizes ..... 70, 10 and 10 per cent off list

Rivets

Large structural and ship rivets..... $2.20 to $2.25
Large boiler rivets..... 2.30 to 2.35
Small rivets ..... 70 and 10 to 75 and 5 off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $38; chain rods, $38; screw stock rods, $43; rivet and bolt rods and other rods of that character, $38; high carbon rods, $45 to $48, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16 in. and larger, $2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.50 base; 5/16-in., $2.50 base. Boat and barge spikes, $2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3 to $3.50 base per 100 lb. Tie plates, $1.75 per 100 lb. Angle bars, $2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $9.30 per package; 8-lb. coating, I. C., $9.60; 15-lb. coating, I. C., $11.80; 20-lb. coating, I. C., $13; 25-lb. coating, I. C., $14.25; 30-lb. coating, I. C., $15.25; 35-lb. coating, I. C., $16.25; 40-lb. coating, I. C., $17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.70c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	60	33½	½	36½	18½
½	65	50½	¾	42¼	27½
¾	69	56½	1 to 1½	44½	29½
1 to 3	71	58½			

Lap Weld

2	64	51½	2	39½	25½
2½ to 6	68	55½	2½ to 6	42½	29½
7 to 8	65	51½	7 to 12	40½	27½
9 to 12	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	56	38½	½	35½	23½
½	62	50½	¾	42½	28½
¾	67	55½	1 to 1½	44½	30½
1 to 1½	69	57½			
2 to 3	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	2	40½	27½
2½ to 4	66	54½	2½ to 4	43½	31½
4½ to 6	65	53½	4½ to 6	42½	30½
7 to 8	61	47½	7 to 8	35½	23½
9 to 12	55	41½	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

To large buyers of steel tubes, a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	63	2½ and 2¾ in.	46
1¼ and 1½ in.	55	3 in.	50
1¾ in.	36	3½ to 4 in.	55
2 and 2¼ in.	42	4¼ in. to 5 in.	47

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.35	Nos. 13 and 14	2.50
Nos. 9 and 10 (base)	2.40	Nos. 15 and 16	2.60
Nos. 11 and 12	2.45		

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.95	No. 28 (base)	3.15
Nos. 22 to 24	3.00	No. 29	3.25
Nos. 25 and 26	3.05	No. 30	3.35
No. 27	3.10		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.15	Nos. 25 and 26	3.85
Nos. 12 to 14	3.25	No. 27	4.00
Nos. 15 and 16	3.40	No. 28 (base)	4.15
Nos. 17 to 21	3.55	No. 29	4.40
Nos. 22 to 24	3.70	No. 30	4.65

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.95	No. 28 (base)	3.15
Nos. 17 to 21	3.00	No. 29	3.20
Nos. 22 to 24	3.05	No. 30	3.20
Nos. 25 to 27	3.10	Nos. 20½ and 31	3.25

Iron and Steel Exports Increase Heavily

Largest Movement in Twelve Months of Both Exports and Imports—New Classification for Machinery

WASHINGTON, May 2.—Consistent with the recovery in the domestic market, the American iron and steel industry made a sharp gain in exports in March, which aggregated 208,843 gross tons, valued at $18,836,718. This is the largest export movement since March of last year, when foreign shipments were equivalent to the pre-war basis and amounted to 230,635 gross tons, valued at $34,526,424, the difference in values between March of this year and the same month last year reflecting the marked price liquidation that has developed.

Exports of Iron and Steel—Gross Tons

	March		Nine Months Ending March	
	1921	1922	1921	1922
Pig iron	2,320	2,724	120,217	19,697
Ferromanganese	20	81	3,117	684
Ferrosilicon	....	51	523	363
Scrap	3,929	5,736	172,083	27,733
Ingots, blooms, billets, sheet bar, skelp	1,023	10,002	80,016	27,482
Iron and steel bars	19,168	13,285	490,771	31,046
Alloy steel bars*	....	2,832	.....	4,095
Wire rods	1,073	8,511	57,031	70,946
Plates, iron and steel	44,627	13,589	705,760	80,197
Sheets, galvanized	7,176	10,065	82,998	53,309
Sheets, black steel	5,800	37,964	130,666	211,718
Sheets, black iron	1,225	1,162	21,639	4,540
Hoops, bands, strip steel	1,939	3,188	35,174	16,655
Tin plate, terne plate, etc.	5,688	6,713	170,576	59,438
Structural shapes, plain material	37,988	7,982	470,784	79,117
Structural material, fabricated	209	2,575	308,186	14,025
Steel rails	48,127	26,066	479,950	154,787
Rail fastenings, switches, frogs, etc.	962	2,499	12,330	12,013
Boiler tubes, welded pipe and fittings	34,562	19,366	341,253	112,898
Cast iron pipe and fittings	3,982	2,587	63,516	19,620
Plain wire	5,613	13,538	159,682	47,319
Barbed wire and woven wire fencing	799	4,822	83,183	20,216
Wire cloth and screening*	....	50	.....	213
Wire rope and cable*	....	616	.....	1,363‡
Wire nails	1,421	7,059	71,241	33,839
All other nails and tacks	319	1,087	12,416	4,663
Horseshoes	48	34	1,389	396
Bolts, nuts, rivets and washers, except track	2,617	1,654	33,114	9,789
Car wheels and axles†	....	1,794	.....	4,528‡
Iron castings†	....	871	.....	2,442
Steel castings†	....	147	.....	683‡
Forgings†	....	178	.....	451‡
Machine screws†	....	15	.....	43
Total	230,635	208,843	4,107,615	1,126,308

*Not reported separately prior to January, 1922.
†Previous to January, 1922, reported by value only.
‡Three months only.

Exports in March of this year represented an increase of 74,868 tons, or 55.8 per cent, over February, whose total was 133,975 tons, valued at $12,950,603. For the nine-month period ending with March of the present year exports totaled 1,126,308 tons, valued at $127,849,986. This compares with 4,107,615 tons, valued at $547,459,661, exported during the same period of last year.

Exports of machinery and imports of iron and steel also showed gains in March, when compared with February. Exclusive of vehicles, machinery exports in March aggregated a value of $19,932,526, which compares with the value of $17,050,199, for similar items in February, although the total reported for that month excluded electrical and agricultural machinery, which brought the figure down to $12,455,903. THE IRON AGE in this number is carrying a new machinery list based upon the reclassification that became effective the first of the current year, and now is including electrical and agricultural machinery in its totals.

The machinery exports for March of last year, excluding vehicles only, totaled $45,795,556. For the nine-month period ending with March of this year, their export value was $183,821,404, as against a value of $493,520,384, for the same period ending March, 1921.

Imports of iron and steel in March totaled 14,140 tons, valued at $3,022,158, or an increase of 26.8 per cent over February, with a total of 11,145 tons, valued at $2,189,115. Imports in March, 1921, amounted to only 5495 tons, valued at $2,835,363. For the nine-month period ending March, 1922, iron and steel imports amounted to 107,899 tons, valued at $20,100,247, as against 216,898 tons, valued at $35,799,830, for the same period ending with March, 1921. Manganese ore imports in March of this year totaled 15,124 tons, valued at $76,916, as compared with 7204 tons, valued at $36,724, imported in February. For the nine-month period ending with March, 1922, these imports totaled 140,807 tons, valued at $785,658. For March of last

Exports, January, 1920, to March, 1922, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
Calendar year 1919	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
Fiscal year 1920	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921	4,168,619	129,541	82,549
July	86,523	2,744	363
August	75,827	2,424	2,447
September	95,169	3,078	1,318
October	106,582	2,830	153
November	122,290	1,299	1,869
December	134,415	2,550	250
Calendar year 1921	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,430	6,627
March	208,843	2,724	10,092
Nine months	1,126,308	19,697	27,482

Imports of Iron and Steel—Gross Tons

	March		Nine Months Ending March	
	1921	1922	1921	1922
Ferromanganese	790	3,819	40,742	10,031
Ferrosilicon	202	343	6,568	8,449
Pig iron	829	1,871	42,414	24,178
Scrap	2,174	2,844	79,177	29,247
Steel bars	172	331	3,980	2,977
Bar iron	64	322	3,458	2,061
Structural steel	83	177	1,175	974
Billets, without alloys	...	1,413	746	9,758
All other billets	126	102	2,920	633
Steel rails	12	1,387	28,446	16,408
Sheets and plates	718	15	2,372	260
Tin and terne plates	89	1,223	384	1,938
Wire rods	236	293	4,516	985
Total	5,495	14,140	216,898	107,899
Manganese ore and oxide	69,710	15,124	563,678	140,807

MACHINERY EXPORTS
By Value

	March, 1921	March, 1922	Nine Months Ending March, 1921	Nine Months Ending March, 1922
Locomotives	$5,317,029	$112,243	$37,743,281	$16,874,931
Boilers	782,244	52,228	8,063,869	1,196,357
Gas Engines	37,773	114,747	537,889	298,548
Diesel and Other Heavy Oil		9,424		*21,487
Marine	131,988	81,764	2,211,109	504,705
Automobile	270,559	526,177	2,064,863	1,734,725
Aircraft		6,517		*11,992
Complete Tractors Except Agricultural	935,866	11,612	19,598,865	249,531
Other Internal - Combustion Engines	157,787	43,944	2,020,379	443,597
Accessories and Parts for		217,726		*604,732
All Other Parts of Engines	1,561,148		17,801,407	†3,251,595
Electric Machinery and Apparatus	9,009,806	4,241,248	84,172,046	41,134,869
Electric Locomotives	4,400		266,972	1,416,503
Excavating Machinery	97,139		2,008,056	†710,739
Concrete Mixers	70,489	37,308	914,476	244,933
Road Making Machinery	107,865		879,000	†414,539
Elevators and Elevator Machinery	107,553		1,611,792	552,821
Mining and Quarrying Machinery	760,452	612,875	7,835,800	3,758,547
Oil Well Machinery	1,288,018		8,821,734	†3,146,283
Pumps	1,293,318	551,404	13,876,203	4,145,242
Lathes	337,856	106,551	4,639,101	849,108
Boring and Drilling Machines		51,097		*171,744
Planers, Shapers and Slotters		19,885		*52,466
Bending and Power Presses		13,511		*191,344
Gear Cutters		1,278		*12,965
Milling Machines		25,817		*64,295
Sawing Machines		3,262		*16,331
Thread Cutting and Screw Machines		19,368		*38,752
Punching and Shearing Machines		9,191		*54,855
Power Hammers		10,477		*33,916
Rolling Machines		7,067		*7,428
Wire-drawing Machines		968		*1,078
Polishing and Burnishing Machines		1,989		*5,832
Sharpening and Grinding Machines	95,645	56,581	2,348,870	612,303
Other Metal Working Machinery and Parts of	1,888,052	433,953	22,622,843	5,447,710
Textile Machinery	2,283,776	1,212,404	19,605,856	12,964,771
Sewing Machines	597,740	554,894	9,599,726	4,111,109
Shoe Machinery	213,782	103,478	2,455,762	782,353
Flour-Mill and Gristmill Machinery	123,572	140,849	1,809,862	656,699
Sugar-mill Machinery	1,642,857		25,378,028	
Paper and Pulp Mill Machinery	352,959		3,043,013	†1,376,074
Sawmill Machinery	128,448	67,365	1,140,019	487,751
Other Woodworking Machinery	320,079	66,933	3,360,752	783,649
Refrigerating and Ice making Machinery	227,246	224,097	3,019,078	1,433,212
Air Compressors	459,409	110,531	4,871,284	1,297,191
Typewriters	1,058,875	1,340,626	16,659,150	7,388,992
Power Laundry Machinery	107,533	60,519	886,801	402,646
Typesetting Machines	278,075	368,677	3,797,009	2,155,272
Printing Presses	938,824	356,638	8,573,572	3,827,823
Agricultural Machinery and Implements	3,200,926	2,382,456	40,725,192	13,728,437
All Other Machinery and Parts	9,607,468	5,562,844	108,556,725	44,148,622
Total	$45,795,556	$19,932,526	$493,520,384	$183,821,404

*—January 1 to March 31, 1922.
†—July 1 to December 31, 1921.

year they totaled 69,710 tons values at $526,543, and for the nine-month period the total was 563,678 tons, valued at $9,496,323.

Japan continues to maintain first position, exceeding Canada, as the leading market for American iron and steel exports. For six of the leading products alone, exports to Japan in March aggregated 64,361 tons, which is equivalent to 30 per cent of all of the exports for the month; it is conservatively estimated that the entire tonnage shipped to Japan in March represented between 40 and 50 per cent of the total. This evidences the fact that the American industry is maintaining a good hold on the Japanese market, but at the same time reflects that there is not a wide distribution in large lots of exports to other markets of the world. The six principal products exported to Japan in March, whose total has been stated, include steel plates, galvanized sheets, black sheets, tin plate, steel rails, and plain wire. The total shipment of these products to Japan during the nine-month period aggregated 316,334 tons.

The largest item of export in March was black steel sheets, the total being 37,964 tons, of which Japan took 33,707 tons. Next in rank were steel rails, with March exports amounting to 26,066 tons, of which Japan took the greatest portion, or 14,001 tons.

The following shows exports in gross tons of some of the leading products and the principal countries of consumption during March, 1922, and for the nine-month period ending that month:

	March, 1922	Nine Months Ending March, 1922
Steel Plates:		
Canada	4,474	42,773
Japan	2,930	9,494
Australia	1,012	2,838
Galvanized Sheets:		
Japan	3,793	16,911
Philippine Islands	2,014	5,631
Canada	1,372	9,676
Mexico	552	2,473
Black Sheets:		
Japan	33,707	178,540
Canada	3,131	19,041
Tin Plate:		
Canada	2,195	17,052
Japan	1,890	27,502
Steel Rails:		
Japan	14,001	61,353
Kwantung	6,290	11,633
Cuba	1,910	2,904
Plain Wire:		
Japan	6,506	22,534
Canada	2,308	9,053
Brazil	834	1,727
Australia	741	2,011
United Kingdom	655	1,444
China	617	1,557
Chile	584	778
Total of above exported to Japan	64,361	316,334

Making Gasoline from Asphalt

SAN FRANCISCO, April 27.—Making gasoline from asphalt, and utilizing oil resources hitherto unavailable for commercial use, have become possible with the perfection of the "Bowie-Gavin process" of extracting oils and gases from asphalts. Details of this process were announced yesterday by C. P. Bowie, petroleum engineer, and M. J. Gavin, petroleum chemist, of the United States Bureau of Mines, San Francisco division.

The first step is the heating of the asphalt sufficiently to make it fluid, after which it is mixed with variable proportions (according to the nature of the asphalt) of inert material, consisting of sand, clay, ground clay, or kindred materials. This mixture is then introduced to the specially designed retort, the Bowie-Gavin retort, where it is "cracked," or separated into gases and inert material along with carbon. The separation, involving the reduction in size of the larger molecules of the asphalt, is effected by allowing the mixture to drop on plates maintained at a temperature of about 1000 deg. Fahr., where it is cracked, after which the vapors from the cracking still are collected and condensed, in the usual manner.

The residue is forced toward the edges of the retort and through an opening, when it is collected. This residue comprises the inert material and carbon, which is entrained in it during the cracking process. The combination of inert material and carbon is then passed through a gas producer, and the gases thus produced, together with fixed gases made during the cracking are burned underneath the apparatus, providing enough to furnish fuel sufficient for carrying on the cracking, and also to replenish the supply of inert material.

The new oil thus obtained, called "cracked oil," yields approximately 20 per cent gasoline and 30 per cent kerosene, together with certain grades of lubricating oils.

"This process," said Mr. Bowie, "will be the instrument by which the vast resources of oil held in oil-soaked sands, asphalts, oil shales and tars, may be made available for commercial exploitation."

The Bangor & Aroostook Railroad, in Maine, will spend $700,000 in repairs and improvements this spring. Several miles of track will be relaid, the rails previously having been purchased. The Worcester Consolidated Street Railway Co. will spend $200,000 in replacing rails in and about Worcester, Mass., within the immediate future.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
April	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
26.....	13.00	12.75	31.12½	5.40	5.25	5.35	5.00
27.....	13.00	12.75	31.00	5.40	5.25	5.35	5.00
28.....	13.00	12.75	30.87½	5.40	5.25	5.35	5.00
29.....	13.00	12.75	....	5.40	5.25	5.35	5.00
May							
1.....	13.00	12.75	31.00	5.40	5.25	5.35	5.00
2.....	13.00	12.75	31.25	5.40	5.25	5.37½	5.02½

*Refinery quotation.

New York

NEW YORK, May 2.

The markets are all generally quiet but strong. Demand for copper is steady and the price is firm. The tin market has been dull with prices practically stationary. Demand for lead is a little less strong, but prices are steady. The zinc market has turned quiet with practically no change in values.

Copper.—The market has undergone very little change in the last week except that prices are, if anything, more uniform, with most sellers quoting the same price. Electrolytic copper for May and June delivery is quoted firm at 13c., delivered, or 12.75c., refinery. Demand is reported as steady but not spectacular, with large and small consumers more or less interested. Export business is also fairly active. The statistical position is claimed to be improving steadily with stocks of blister copper as well as refined copper lower than in many months.

Copper Averages.—The average price of Lake copper for the month of April, based on daily quotations in THE IRON AGE, is 12.86½c. The average price of electrolytic copper is 12.61c., refinery, or 12.86c. delivered.

Tin.—Very little business has been transacted in the past week outside of about 300 tons sold late last Tuesday, April 25, most of it going to dealers. The market has been a dull and uninteresting one with practically no features of importance. There is reported, however, a substantial inquiry underlying the market which would result in business at a price below market values. This is likely to develop into transactions later. On the New York Metal Exchange about 100 tons was sold on April 27 and 25 tons on April 28 at close to 31c. in both cases for the various deliveries involved. Statistics for the month of April show that deliveries into consumption have been 4995 tons with 1451 tons in stock and 1280 landing on April 30. Imports for the first four months of this year have been 19,550 tons, as contrasted with 5998 tons for the same four months last year. The quantity of tin afloat is reported as 3375 tons. The quotation for spot Straits tin, New York, has hovered close to 31c. the past week, with quotations to-day at 31.25c., New York. The London market to-day was quoted at £152 5s. for spot standard, £153 15s. for future standard and £155 for spot Straits, all about £1 per ton above quotations a week ago.

Lead.—This market is quieter than in some weeks but still very firm. The difference in quotations between those of the leading interest and of the outside market continue a feature. While the leading interest quotes 5.25c., New York, independent sellers are asking and obtaining from 5.40c. to 5.50c., New York, with the asking price as high as 5.55c. In St. Louis there are sellers at 5.25c. Buyers are not as eager as they have been and more lead is appearing in the market.

Zinc.—This market has turned quiet, but there have been no recessions in price. Prime western for early or May delivery is obtainable at a range from 5c. to 5.05c., St. Louis, or 5.35c. to 5.40c., New York, with some business done between these limits. There has been a lull in demand from galvanizers, but this is considered as due possibly to the coal strike and only temporary.

Antimony.—This market has become considerably stronger, due partly to the elimination of cheap lots, so that wholesale lots for early delivery are quoted at 5.25c. to 5.50c., New York, duty paid. The question of a tariff is also considered a factor in the advance.

Aluminum.—Virgin metal, 98 to 99 per cent pure in wholesale lots for early delivery, is quoted by the leading interest at 19c. to 19.10c., f.o.b. plant. The same grade from importers is obtainable at about 17.50c. to 18c., New York, duty paid.

Old Metals.—The market continues firm and business is better. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	11.50
Copper, light and bottoms	9.50
Heavy machine composition	9.50
Brass, heavy	7.00
Brass, light	5.75
No. 1 red brass or composition turnings	8.00
No. 1 yellow rod brass turnings	6.50
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

MAY 2.—Outside of a fair demand for lead, the metals have been rather quiet. Lead and antimony have advanced, but otherwise both new and old metals are unchanged. We quote in carload lots: Lake copper, 13.25c. to 13.50c.; tin, 32.75c.; lead, 5.50c.; spelter, 5.15c.; antimony, 7.25c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 8c.; red brass, 7.50c.; yellow brass, 6c.; lead pipe, 4c.; zinc, 2.75c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 25c.; all buying prices for less than carload lots.

Order Prevails at Uniontown

UNIONTOWN, PA., May 2.—No further disorders have marked the situation in the Connellsville bituminous region following the rioting on Saturday morning. Hearings of 51 men and three women arrested during the Tower Hill disturbances on charges of rioting, inciting riot, unlawful assembly and assault and battery, will begin here to-morrow before a local alderman. Bail has been fixed at $2,000 on each count.

State Police Captain Smith and Sheriff I. I. Shaw had a conference this afternoon with mine union leaders at Brownsville regarding mass meetings in the county. Saturday night the sheriff issued a proclamation forbidding all meetings other than those of respective locals, ruling that no miner from another plant or union leader could be present. It is understood this afternoon that the sheriff, State police and union leaders reached an agreement whereby mass meetings will be permitted under restrictions. A meeting has been arranged for in Connellsville to-morrow as a test case, the union carrying newspaper advertisements of the meeting. Production in the region is showing a gain, indicating that the union is losing ground. No further gains have been made in the Leisenring section.

The Steel City Iron Co., recently formed at Youngstown, Ohio, has established offices at 411-C Federal Building. The company is preparing to warehouse and fabricate structural steel and ornamental iron. Its authorized capital consists of $100,000 common stock, of 10,000 shares of $10 par value, which is being offered for subscription.

The Reliable Machine Co., machinist, 1188 Main Street, Bridgeport, Conn., recently changed the name to the Wheeler Insulated Wire Co., and will manufacture insulated wire, etc. The personnel remains the same.

British Iron and Steel Market

Prices Easing Off with Business Stagnant—Government Labor Inquiry Starts—Continental Quotations

(By Cable)

LONDON, ENGLAND, May 2.

The Government has established a court of inquiry in connection with the engineering labor dispute. Meanwhile, employers are willing to engage men on individual contracts, from Wednesday.

Pig iron market is generally quiet, though export sales are being maintained, especially with the Continent. The home trade is practically stagnant. Hematite is weak. Home and foreign inquiry has diminished and stocks are accumulating.

Bilbao Rubio ore is nominally 27s. ($5.97) ex-ship Tees.

Export sales of finished steel are slightly improved, but the home trade is stationary. Many works which closed down over the Easter holidays have not yet reopened. Continental business is slightly more active, but prices generally are weakening. India is inquiring for fair lines of merchant bars.

Continental prices are shown in the table.

Tin plate is weaker on diminished buying, though many works are well booked up and are not keen sellers. Prompt delivery is being sold at 19¾s. ($4.31) basis, f.o.b. There is moderate inquiry from most Continental quarters and some business is moving, though no sales have yet been reported. Home trade consumers are moderately active. Odd sizes are being sold at 19¼s. ($4.09) f.o.b.

Galvanized sheets are quiet.

Some black sheet makers are anxious for orders and Japanese business is being booked at low figures. Makers generally, however, are quoting £15 15s. (3.11c. per lb.) f.o.b., July delivery, on Japan 6 x 3, 13's. Indian specifications of 6/8's are quoted at £11 10s. (2.27c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.42 per £1, as follows:

Durham coke, delivered	£1	8s.		to £1	8½s.		$6.19	to	$6.30
Cleveland No. 1 foundry	4	15					21.00		
Cleveland No. 3 foundry	4	10					19.89		
Cleveland No. 4 foundry	4	7½					19.34		
Cleveland No. 4 forge	4	2½		to 4	5		18.23	to	18.79
Cleveland basic	4	10					19.89		
East Coast mixed	4	15		to 4	17		21.00	to	21.44
Ferromanganese	15	0		& 14	10*		66.30	&	64.09*
Rails, 60 lb. and up	8	0		to 9	10		35.36	to	41.99
Billets	7	8		to 8	0		32.71	to	35.36
Sheet and tin plate bars, Welsh	7	7½					32.60		
Tin plates, base box	0	19½		to 0	19¾		4.20	to	4.31
							C. per Lb.		
Ship plates	9	5		to 10	10		1.83	to	2.07
Boiler plates	13	10		to 14	0		2.66	to	2.76
Tees	9	10		to 11	0		1.88	to	2.17
Channels	8	15		to 10	5		1.73	to	2.02
Beams	8	10		to 10	0		1.68	to	1.97
Round bars, ¾ to 3 in.	10	10					2.07		
Galvanized sheets, 24 g.	16	0					3.16		
Black sheets	12	10		to 12	15		2.47	to	2.52
Steel hoops	12	0		& 12	5*		2.37	&	2.42*
Cold rolled steel strip, 20 g.	23	10					4.64		
Cotton ties, Indian specifications	15	0					2.96		

*Export price.

Continental Prices, All F.O.B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:									
Belgium, May	£4	17½s.		to £5	0s.		$21.55	to	$22.10
Luxemburg, May	4	17½		to 5	0		21.55	to	22.10
France, May	5	10					24.31		
Merchant bars:							C. per Lb.		
Belgium, June, July	7	17½					1.55		
Luxemb'g, May, June	8	7½		to 8	10		1.65	to	1.68
Germany, June, July	8	5		to 8	10		1.63	to	1.68
France, May, June	8	10					1.68		
Joists (beams):									
France, May	7	5		to 7	15		1.43	to	1.53
Belgium, May, June	7	5		to 7	12½		1.43	to	1.51
Luxemb'g, May, June	7	5		to 7	12½		1.43	to	1.51
3/16-In. plates:									
Germany, May, June	8	5		to 8	15		1.63	to	1.73
⅛-In. sheets:									
Belgium, May, June	10	0					1.97		
16-Gage sheets:									
Belgium, May, June	15	10					3.06		

Export Inquiry Good—Strike Holding Up Business—New Foreign Trade Company

LONDON, ENGLAND, April 20.—There still seems to be no early settlement of the engineering dispute in sight, in spite of the fact that conciliatory efforts are still being made in influential quarters, but the Amalgamated Engineering Union seems stubborn. In the meantime business in the iron and steel trades, as far as home sales are concerned, is suffering from this dispute, consumers naturally being disinclined to place orders. Most of the steel works are prolonging the Easter holiday and remaining closed for the rest of the week and, indeed, some are very doubtful as to when they will re-open again.

There is plenty of export inquiry, but only one or two makers are in a position to accept the prices which must be taken to secure such business, so that the bulk of the large works, such as the plate and shape makers, are dependent upon domestic orders, with the result that practically none of them have any accumulation of specifications on hand. The demand for pig iron, however, continues on a fair scale. Germany is taking good quantities, while Roumania is inquiring for substantial parcels for fairly prompt shipment. Whether works will be able to supply this, however, remains to be seen. Prices keep firm, No. 3 Cleveland being quoted at 90s., and East Coast hematite at 97s. 6d. to 98s. 6d., though purchasers are looking for a reduction when the ironmasters meet again next week.

An important new company has just been formed for the purpose of promoting foreign trade, and is entitled The British Power & Transport Finance Co. The initial capital is £250,000 and the directors are: W. L. Hichens, Chairman of Cammell Laird & Co.; Sir John Hunter, managing director William Arrol & Co.; P. J. Pybus, managing director the English Electric Co.; Hugh Reid, managing director North British Locomotive Co., and John Sampson, director John Brown & Co. This company forms one of the most important groups of manufacturing units on this side, and is primarily for the carrying out of large engineering contracts overseas.

German Iron and Steel Market

Pig Iron Advanced Again—Coke Shortage Forces Iron Imports from England

BERLIN, GERMANY, May 2 (*By Radio*)—The iron and steel market is increasingly active. Demand for pig iron, steel plates and wire is strong. The supply of pig iron is insufficient and therefore considerable quantities are imported from Luxemburg and England, the latter at 7000 marks per metric ton.

German home pig iron prices were again raised May 1. Hematite was advanced from 6264 to 6435 m. per ton; foundry iron No. 1 from 5549 to 5870 m.; foundry iron No. 3 from 5473 to 5800 m.; Siegerland steel making iron from 5565 to 6000 m. and spiegeleisen from 6020 to 6825 m. The Eisenwirtschaftsbund reports smelting badly hampered because of a shortage of coke. Therefore it proposes to buy the coke reserves of the railroads and itself import English coal for railroad use, by this means refiring 20 blast furnaces which had been blown out.

The scrap market has been weak since the end of March. The price has fallen from 5000 to 3500 marks per ton.

PERSONAL

George K. Leet, the newly elected secretary of the United States Steel Corporation, was born in New York, but until he returned to that city to become private secretary to Judge Gary, 11 years ago, he spent most of his time in Washington. Being the son of a distinguished soldier, a member of General Grant's staff, it was natural for him to seek military service, as he did during the Spanish-American war, serving in the quartermaster's department. Later he was connected with the United States Treasury for a number of years and then accepted the private secretaryship, the many duties of which he has discharged with the greatest success. Under the direction of Judge Gary, he has been the dispenser of information in regard to the Steel Corporation, meeting newspaper men, magazine writers and other callers. His promotion to the secretaryship has been received with many expressions of approval.

GEORGE K. LEET

Fred Mather Waterman, the new treasurer of the Steel Corporation, was born Jan. 30, 1872, at Wheaton, Ill., and was educated in the public schools at Westside, Iowa, and the Iowa Business College, Des Moines. He entered the Merchants' Loan & Trust Co. Bank, Chicago, at the age of 16, and worked there 14 years. He entered the employ of the United States Steel Corporation in 1902 as cashier, and has remained since, having been acting treasurer during the past 15 months, when Richard Trimble, treasurer, was incapacitated by illness.

FRED M. WATERMAN

J. G. Miller, formerly president Reed, Fears & Miller, is now engaged in the coal and coke business, 516 Stock Exchange Building, Philadelphia.

Boyd Watson has been appointed Eastern sales manager of Spang, Chalfant & Co., Inc., Pittsburgh, which has opened an Eastern sales office in the Grand Central Terminal Building, New York.

R. E. Zimmerman, director of the research laboratory of the American Sheet & Tin Plate Co., has been appointed assistant to S. A. Davis, vice-president in charge of operations, succeeding the late Robert Skemp.

Sidney F. Woodbury, for eight years purchasing agent and director of traffic for the Willamette Iron & Steel Works, Portland, Oregon, left the service of that company May 1 to open an office and warehouse to buy and sell iron and steel products. His headquarters will remain in Portland, and the business will be conducted under the name of Woodbury Steel & Machinery Co.

William J. Grippin, treasurer of the Bilton Machine Tool Co., machine and tool manufacturer, Bridgeport, Conn., and a former officer of the Bridgeport Malleable Iron Works, and the Eastern Malleable Iron Co., Bridgeport, has recently been chosen treasurer of the Artistic Bronze Co., manufacturer of cast brass and bronze hardware, Bridgeport. Mr. Grippin was also chosen a director of the company.

E. C. Hvale, recently appointed district sales manager Theodore Geissmann & Co., iron and steel mill representative, McCormick Building, Chicago, with headquarters at Minneapolis, has opened an office at 920 McKnight Building in the latter city.

W. H. Saunders, district sales representative, National Cast Iron Pipe Co., with headquarters at Dallas, Texas, has been transferred to Kansas City, Mo. He has been succeeded at Dallas by B. L. Hendershot.

Henry C. McEldowney, president, the Union Trust Co., Pittsburgh, has become a director of the Pittsburgh Steel Co., Pittsburgh, in the place of John Bindley, deceased.

Walter F. Rogers, formerly with the Norton Co., has joined the sales force of the Reeves Co., Columbus, Ind.

Howard C. Noble, president North & Judd Mfg. Co., New Britain, Conn., has returned from several weeks' vacation in Florida.

Charles A. Reed, treasurer, has been elected president Reed, Fears & Miller, Inc., New York, Boston and Philadelphia, pig iron, etc., to fill the unexpired term of J. G. Miller, who recently retired from the corporation.

George Croak, recently foundry superintendent Athol Machine Co., Athol, Mass., and formerly associated with the Becker Milling Machine Co., Hyde Park, Boston, has been made general manager Palmer Foundry & Machine Co., Palmer, Mass.

Reorganization of the supply sales department and the establishment of a merchandising sales department have just been completed by the Westinghouse Electric & Mfg. Co. The changes, which entail the promotion and transfer of a number of officers, became effective May 1, when the new merchandising sales department began to function. J. J. Gibson, manager of the supply sales department, becomes assistant to vice-president in the new plan of organization and will have general supervision of both the supply sales department and the merchandising sales department. Other changes and transfers in personnel are as follows: A. A. Brown is appointed manager of syndicate operation; J. S. Tritle, manager of the St. Louis office of the company, becomes manager of the merchandising sales department; T. J. Pace, assistant manager of the supply department, becomes manager of the supply sales department; C. E. Allen, manager of the central station division of the Chicago office, becomes manager of the St. Louis office, succeeding Mr. Tritle; George Baily, assistant to the manager of the supply department, becomes supervisor of distributing agents; M. C. Morrow, assistant sales manager of the Westinghouse Electric Products Co., becomes assistant to the manager of the merchandising sales department, and J. J. Dorney, manager of the industrial division, St. Louis office, becomes assistant to the manager of the merchandising department.

Charles M. Schwab, president Bethlehem Steel Co., has accepted the invitation of the Associated Advertising Clubs of the World to address the annual international convention to be held in Milwaukee, June 11 to 16.

George L. Lorch, general superintendent Eagle Mfg. Co., tractors and power farm implements, Appleton, Wis., has resigned to accept a similar position with the U. S. Tractor & Machinery Co., Menasha, Wis.

Edward S. Jordan, president Jordan Motor Car Co., Cleveland, has been selected as one of "the ten foremost graduates" of the University of Wisconsin by a referendum conducted among more than 20,000 alumni.

A. L. Marsh, formerly central Pennsylvania advertising manager of THE IRON AGE, has been advanced to the position of Michigan advertising manager. His headquarters are at 317 West Fort Street, Detroit.

By authority of the executive committee of the Sesqui-Centennial Exposition to be held in 1926, Mayor Moore of Philadelphia has announced the personnel of a Committee on Manufactures which includes the following representatives of iron and steel and allied lines: James B. Bonner, Carnegie Steel Co.; Fayette R. Plumb, Jr., Fayette R. Plumb, Inc.; Alvah C. Dinkey, Midvale Steel & Ordnance Co.; Hollinshead N. Taylor, N. & G. Taylor Co.; Alan D. Wood, Alan Wood Iron &

Steel Co.; Walter Wood, R. D. Wood & Co.; Frank Disston, Henry Disston & Sons Co., all of Philadelphia.

E. T. McNulty, who recently resigned as superintendent, Yorkville, Ohio, works, Wheeling Steel Corporation, to become general manager, the Charcoal Iron Products Co., Washington, Pa., was tendered a farewell dinner by his former associates at the McClure Hotel, Wheeling, W. Va., April 29, and was presented a gold watch.

G. C. Tinsley has resigned as vice-president and sales manager of the Commercial Shearing & Stamping Co., Youngstown, Ohio, to engage in the brokerage sale of sheets, plates and other steel products, under the name of the Commercial Steel Co., 401 Dollar Bank Building, Youngstown.

OBITUARY

Laroy S. Starrett

LAROY S. STARRETT, founder and president, the L. S. Starrett Co., manufacturers of machinists' precision tools, Athol, Mass., whose death on April 23 at St. Petersburg, Fla., was noted in last week's issue of THE IRON AGE, was a philanthropist, inventor and business man of unusual attainment. Born in China, Me., April 25, 1836, he lived to within two days of his eighty-sixth birthday. He was of Scotch descent. When only 17, he operated a farm of 600 acres in Newburyport. At that time his inventive genius was developing rapidly, and in 1864 he was granted a number of patents, and opened a machine shop in Newburyport.

LAROY S. STARRETT

In 1868 he went to Athol where he combined his business with the Athol Machine Co. in order to manufacture his own inventions, becoming general agent and superintendent of the concern.

Forced out by his fellow officials on a point of company policy, he lost not only his money and position, but shortly afterward became totally deaf.

In spite of these handicaps, Mr. Starrett again embarked in business and the first Starrett tools were made in 1880, when Mr. Starrett hired a single room in a shop where the Starrett plant now stands.

In addition to his connection with the L. S. Starrett Co., Mr. Starrett was treasurer and practically the owner of the Athol Machine Co., and was interested financially in the Union Twist Drill Co.

M. COHEN, for years identified with the iron and steel scrap business at Muncie, Ind., and Chicago, died of heart failure in Los Angeles on April 13, at the age of 63. He had been in business at Muncie for 30 years, latterly under the firm name of Cohen & Son. He was then associated for five years with his sons, D. R. and F. A. Cohen, at Chicago, retiring about five years ago.

EDWIN J. BUTLER, assistant to the general manager Kelly & Jones Co., Pittsburgh, pipe, fittings and plumbers' supplies, died at his home in Dormont, Pa., April 25. He was a native of Pittsburgh and had been identified with Kelly & Jones Co. for 16 years.

JOSEPH HERBERT BRIGHTMAN, of the Brightman Mfg. Co., South Columbus, Ohio, manufacturer of shafting, died at his home in Columbus, April 21, aged 35. Mr. Brightman was born at Youngstown, Ohio, Dec. 4, 1886. After studying mechanical engineering at Case School of Applied Science, Cleveland, and Ohio State University at Columbus, he entered business in 1911 with his father and four brothers, as assistant secretary and treasurer of the company, which position he held at the time of his death.

HULDREICH A. ZURCHER, JR., secretary and treasurer of the Canton Bridge Co., Canton, Ohio, died April 24, after a ten weeks' illness, age 42 years.

JOHN R. SHERWOOD, sales manager, Singer Mfg. Co., Bridgeport, Conn., died at the Bridgeport hospital, April 26.

P. H. MAGIRL, president, the MaGirl Foundry & Furnace Works, Bloomington, Ill., died in that city on April 21, after an illness of two weeks which terminated in a major operation. Mr. MaGirl was born April 14, 1850, and was a molder by trade in his early life. In 1892, he started in the foundry business, forming a partnership known as MaGirl & Diedrich. He bought out his partners in 1896.

Government Statistics on Strike

WASHINGTON, May 2.—Analysis of the coal situation made by the Coal Bureau of the Natural Resources Production Department, of the Chamber of Commerce of the United States, indicates that there is no danger of any general shortage of coal for at least six weeks. This statement seems to be thoroughly confirmed by the report of the Geological Survey for the fourth week of the strike, April 24-29. The Government report indeed indicates that, if anything, the analysis of the Chamber Bureau is too conservative. The Geological Survey report shows that production has turned upward and the output of bituminous coal for the week mentioned is expected to pass the 4,000,000-ton mark, with production of anthracite practically nil.

The Geological Survey, in part, says:

"Telegraphic reports indicate a definite increase in production of soft coal during the present week (April 24-29). Loadings on Monday, April 24, were 12,131 cars. This was the highest since the strike began, yet it was exceeded on Tuesday and again on Wednesday, when 12,520 cars were loaded. If this rate be maintained during the rest of the week, the total output should approximate 4,150,000 tons. The trend of production may be seen from the following table of cars loaded daily:

Day	First Week	Second Week	Third Week	Fourth Week
Monday	11,445	10,772	7,898	12,131
Tuesday	11,019	10,658	10,041	12,377
Wednesday	11,437	10,961	11,088	12,520
Thursday	11,090	11,482	11,193	12,000
Friday	11,296	10,714	11,596	
Saturday	8,888	8,501	10,194	

"The increase of the present week has come largely from the non-union districts of the Middle and Southern Appalachians. It is not due to the return to work of striking miners, either union or non-union, but rather to increased demand resulting in greater activity in those districts which have remained at work.

"The quickening of the market has not yet been sufficient to absorb fully the accumulation of unbilled cars of coal at the mines, although it is true that the number of these unconsigned loads is steadily decreasing. Reports of 'No market' continue to be received, especially from the South and West, and production has not yet reached the limit set by the capacity of the mines not affected by the strike.

"Consumption is still being met largely from storage. Even at the present rate of output, the draft upon consumers' stock piles can not be much less than 4,000,000 tons a week."

Investigations of the Bureau of Labor Statistics at Washington show that during the period from October 8 to February 11, from 33 to 50 per cent of all the bituminous mines reporting were entirely idle. The proportion working full time or more, in the different weeks, ranges from 2 to 10 per cent. The amount of unemployment is reflected in the yearly income of miners' families, which average $1,591, with a total average expenditure per family of $1,706.

The Johns-Pratt Co. and the Hartford Machine Screw Co., Hartford, Conn., report a material increase in business, largely because of radio work. Both companies are well booked ahead.

Machinery Markets and News of the Works

RAILROADS INQUIRING

Chicago, Burlington & Quincy and Western Maryland Issue Lists

Slight Improvement Is Noted in Business—Used Tools Are Moving in Fair Volume

More railroad inquiry for machine tools is in the market at present than at any time in a considerable period. The Chicago, Burlington & Quincy at Chicago has issued an inquiry for 78 machines of various types and the Western Maryland at Baltimore has sent out a list of 21 tools. The Big Four has asked for prices on four tools for its Kankakee, Ill., shops and has withdrawn temporarily its inquiry for its Beech Grove, Ind., shops. All bids are in on the large tool requirements of the Atchison, Topeka & Santa Fe, but it probably will be weeks before definite action is taken.

The machine-tool trade has been looking to a resumption of railroad buying to give stimulus to a more general recovery, but so far the railroads have bought very little equipment for machine shop installation.

Used tools are moving in fair volume, and there is a slightly better demand for new tools. Buying, however, is still mostly confined to lots of one, two or three tools and there has been very little large buying. An Eastern manufacturer has contracted for 15 to 18 automatic screw machines, an order which is of record-breaking size for these times.

Among recent purchasers of tools are the Barber Asphalt Co., which has bought a few for its Buffalo plant; the International Nickel Co., which bought two milling machines and a planer; the Ohio Cash Register Co., Dayton, Ohio, which has begun to buy against its recently announced requirements; the P. H. Murphy Co., New Kensington, Pa., which bought two large Toledo presses.

The Delco Light Co., Dayton, Ohio, is reported to be preparing a list of tools which will be inquired for soon. The Milwaukee Board of Education has asked for bids on a number of lathes and a list of eight metalworking and six woodworking machines has been issued by the Western Penitentiary, Pittsburgh.

New York

NEW YORK, May 2.

The Western Maryland Railroad, which has its purchasing office at Baltimore, has inquired for the following machines:

One punch and shear.
One rod boring machine.
One 14-in. lathe.
One 26-in. lathe.
One 36-in. lathe.
One 48-in. lathe.
One 2-in. bolt-cutting machine.
One 6-in. pipe-threading machine.
One 20-in. vertical drilling machine.
One 28-in. vertical drilling machine.
One 5-ft. radial drill.
One 6-in. power hack saw.
One 20-in. slotter.
One 300-ton wheel press.
One 5-spindle centering machine.
One 36-in. planer.
One 42-in. planer.
One driving wheel lathe.
One 52-in. boring and turning mill.
One 62-in. boring and turning mill.
One bushing press.

Machine-tool business in this market has shown a slight improvement within the past week. Some sellers report having done more business than in weeks. The Barber Asphalt Co. has bought a few machines for its Buffalo plant and the American Locomotive Co. also bought a few machines. The Delaware & Hudson Railroad, which has bought only three tools against its recent inquiry for seven, is expected shortly to issue a new inquiry for about 20 tools.

A large order for automatic screw machinery, said to total about 15 to 18 tools, has been placed by an Eastern manufacturer with a Cleveland company.

Demand for used tools continues to exceed that for new tools. The McCabe & Shearan Machinery Corporation reports having sold within the past week or so the following used machines: 10-ft. Niles boring mill, two 1500-lb drop hammers, 36-in. planer, two 24-in. lathes, one shaper and two milling machines.

The National Foundry Co. of New York, Inc., 2-40 Sandford Street, Brooklyn, advises THE IRON AGE that it is in the market for a sand cutting machine and other labor-saving equipment. The company manufactures cast-iron pipe and fittings.

The dullness in the crane market that set in about two weeks ago in this district continues. Although there are few new inquiries, prospects are that some that have been pending for some time will be closed shortly. Bids were recently received on a 3-ton gantry crane by the Lehigh Valley Railroad for use at Claremont, N. J., and the 40-ton gantry crane inquired for by the New York Central & Hudson River Railroad has not yet been placed. The Smith-McCormick Co., Easton, Pa., which recently inquired for a locomotive crane, is reported to have purchased.

Among recent sales are: Heyl & Patterson, a 10-ton coal and ore handling bridge to the Mississippi Valley Iron Co., St. Louis, and a 6-ton coal-stocking bridge for the Colfax power station of the Duquesne Light & Power Co., Pittsburgh. The U. G. I. Contracting Co., Philadelphia, is said to have closed for the 50-ton crane, inquiry for which has been pending for some time.

The John Kroder & Henry Reubel Co., 107 East Seventeenth Street, New York, manufacturer of metal curtain poles, etc., with plant on Meeker Avenue, Brooklyn, is taking bids for a new three-story factory at 38-40 Henry Street, Brooklyn, to cost about $150,000 with equipment. Berger & Son, 309 Broadway, New York, are architects.

Fire, April 27, destroyed the two-story machine shop at the plant of the Nichols Copper Co., Laurel Hills, Long Island City, with loss estimated at about $40,000. Headquarters are at 25 Broad Street, New York.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until May 22 for 24 fuel oil heaters and spare parts for the Brooklyn and Puget Sound navy yards, under schedule 9618.

The Williams Garage Co., Adams Center, N. Y., will install a new high-speed drill, electrically operated blower and other equipment in its repair shop.

The Columbia Ice Co., 406 East 149th Street, New York, is completing plans for the erection of a two-story ice-manufacturing and refrigerating plant, 140 x 150 ft., at Whitlock and Bryant avenues, to cost about $330,000, including machinery. Ophuls, Hill & McCreery, 112 West Forty-second Street, are engineers.

The Department of Plant and Structures, Municipal Building, New York, Grover A. Whalen, commissioner, has filed plans for a one-story automobile service and repair building, 95 x 196 ft., at 251-63 Delancey Street, estimated to cost about $60,000.

The Dubilier Condenser & Radio Co., 217 Centre Street, New York, recently organized, will take over and consolidate the Dubilier Condenser Co., the Cambridge Mfg. Co. and the Federal Mica Co., all at the address noted. The new com-

pany will continue in the present line of manufacture, with extensions to include wireless equipment and accessories. It is capitalized at $500,000 and headed by William Dubilier.

The Board of Directors, Albany Hospital, Albany, N. Y., will make extensions and improvements in the power house to cost about $125,000. Griggs & Myers, 347 Fifth Avenue, New York, are engineers.

The E. Steinhorst Co., Eagle and Mohawk streets, Utica, N. Y., manufacturer of sheet metal products, is planning for the installation of equipment at its plant.

A. E. Fitkin & Co., 141 Broadway, New York, have acquired the Tidewater Power Co., Wilmington, N. C., for about $5,000,000. The new owner contemplates extensions and betterments in power plant and system.

A refrigerating plant will be installed in connection with the new three-story skating rink, 200 x 225 ft., to be constructed by Iceland, Inc., 242-64 West Fifty-third Street, New York, on Fifty-third Street, estimated to cost about $200,000. Corry B. Comstock, 110 West Fortieth Street, is engineer.

The Q-R-S Music Co., Walnut Avenue and 135th Street, New York, manufacturer of music rolls for mechanical players, is arranging for extensions in production to include a full line of radio instruments and equipment, receiving sets, etc. Portions of the local plant and the works at Chicago and San Francisco will be converted for this purpose. A fourth plant will be established at Toronto. To carry out the expansion the company has arranged for a sale of stock totaling $255,000. Executive offices are in the Kimball Building, Chicago. A. N. Page is secretary.

A vocational department will be installed in the new two-story high school to be erected at Hudson Falls, N. Y., estimated to cost $200,000. Waite & Copeland, 46 Cornhill Street, Boston, are architects.

The T. H. Symington Co., 233 Broadway, New York, manufacturer of journal boxes, draft gear equipment, and other railroad specialties, with plant at Rochester, N. Y., has disposed of a bond issue of $1,500,000, the proceeds to be used in part for additional working capital and plant expansion. Charles J. Symington is president.

The Westinghouse Air Spring Co., 109 West Sixty-fourth Street, New York, has leased the second floor in the building on Henry Street, between Ely Avenue and William Street, Long Island City, for a local works.

C. Brandes, Inc., 32 Union Square, New York, manufacturer of wireless equipment, receiving sets, etc., has leased a floor in the building at 237-39 Lafayette Street, for a new plant.

The Standard Oil Co. of New Jersey, 26 Broadway, New York, has acquired the West India Oil Refining Co. of Kentucky. The company purchased controls the West India Oil Refining Co. of Cuba, with refinery at Havana Harbor. Extensive operations are planned, to include activities in South America. The Standard Oil Co. has concluded arrangements with the British Consolidated Oilfields, Ltd., to take over and develop oil properties in the Buchivacoa district of Venezuela, with the West India company to act as the operating unit in this territory. It has also closed a contract with the Mexican Seaboard Oil Co., operating in the Toteco Hacienda field, Mexico, for 45,000 bbl. of oil daily for 2½ years, to be refined at the plants of the Standard company.

Ashlund, Fager & Weiterer, Inc., New York, recently organized to manufacture sheet metal products, will operate a plant at 4121-25 Park Avenue, with fabricating, assembling and other departments. It is headed by John A. Fager, formerly factory superintendent for M. F. Westergren, Inc., 213 East 144th Street, manufacturer of similar products; and Charles Ashlund and George Weiterer, previously connected with the same organization.

The Empire Gas & Fuel Co., operated by the Cities Service Co., 60 Wall Street, New York, with oil refineries in Kansas, Oklahoma and Texas, is disposing of a bond issue of $40,000,000, a portion of the proceeds to be used for plant and system extensions. Frank W. Frueauff is president.

The Public Service Electric Co., Public Service Terminal Building, Newark, has plans under way for the erection of an addition to its power house at Jersey City, N. J., to cost about $150,000. N. A. Carle is engineer.

The White Metal Mfg. Co., 1006 Clinton Street, Hoboken, N. J., manufacturer of metal tubing, etc., will commence the immediate erection of a two-story addition to its plant at North Bergen, N. J., to cost about $50,000. Leo Feinen, 2697 Boulevard, Jersey City, is architect.

The Borough Council, Beach Haven, N. J., will receive bids until May 8 for a municipal electric power plant, with equipment to include two single cylinder oil engines, direct connected to generators, and auxiliary operating apparatus. Hubert C. Verhey and Remington & Vosbury, 601 Market Street, Camden, N. J., are engineers. A. Paul King is borough clerk.

A vocational department will be installed in the proposed high school to be erected at Pitman, N. J., estimated to cost about $225,000.

The Central Ice & Cold Storage Co., Vineland, N. J., will commence the erection of a one- and two-story ice-manufacturing and cold storage plant, 90 x 115 ft., to cost about $300,000, including machinery. Courtland Williams is president.

The Radioceive Co., a New York corporation, has leased the upper portion of the building of the Fergus Motors Co. of America, 307 Jelliff Avenue, Newark, for the establishment of a plant to manufacture wireless head sets and general radio equipment.

Herpers Brothers, 18 Crawford Street, Newark, manufacturers of jewelry, have plans nearing completion for a new four-story factory at 474-76 Washington Street, 52 x 100 ft. Edward A. Wurth, 207 Market Street, is architect.

A vocational department will be installed in the two-story high school to be erected at Freehold, N. J., estimated to cost $250,000. J. N. Pierson & Son, 175 Smith Street, Perth Amboy, N. J., are architects.

Chicago

CHICAGO, May 1.

April showed a slight gain in machine tool sales over March and this month is expected to register a more pronounced improvement. Whereas most sales up to this time have covered single machines, there are a number of attractive pending inquiries covering a group of tools which are about to be closed. One of these is an inquiry from the Milwaukee Board of Education for six 11-in. x 4-ft. loose change gear lathes, six 13-in. x 5-ft. loose change gear lathes, a 14-in. x 6-ft. lathe, a No. 3 arbor press and a surface grinder. Sales of second-hand equipment are still in the majority, but it is notable that a number of users now in the market are interested in new machines exclusively. Although small shops are doing most of the current buying, a number of the larger industrial companies are now contemplating the purchase of equipment. The Studebaker Corporation recently placed an order for a 5-ft. motor-driven radial drill for its South Bend works. Railroad inquiries are conspicuous because of their size, but do not promise immediate business. All bids on the Santa Fe list are now in, but it is expected that several weeks will elapse before figures have been tabulated and finally passed upon. The latest railroad inquiry to appear is from the Chicago, Burlington & Quincy, covering 78 machines for distribution among various shops over the system. The list follows:

One 24-in. motor-driven engine lathe, 96 in. between centers.

Two 28-in belt-driven engine lathes, 96 in. between centers.

One 18-in. belt-driven engine lathe, 51 in. between centers.

One 28-in. belt-driven engine lathe, 120 in. between centers.

One 18-in. motor-driven engine lathe, 51 in. between centers.

One 24-in. belt-driven engine lathe, 96 in. between centers.

One 24-in. belt-driven engine lathe, 84-in. between centers.

One 20-in. belt-driven engine lathe, 72 in. between centers.

One 20-in belt-driven engine lathe, 52 in. between centers.

One 18-in. motor-driven engine lathe, 120 in. between centers.

One 84-in. motor-driven wheel lathe.

One double end motor-driven carwheel axle lathe.

One 50-in. motor-driven coach wheel lathe with spindle sleeve to take 9⅛-in. x 14-in. journals with collars 10⅝ in. in diameter.

One 2-in. x 24-in. belt-driven flat turret lathe.

One 2¼-in. x 12-in. motor-driven flat turret lathe.

Two motor-driven carwheel boring mills to bore wheels up to 42 in. in diameter.

Two 42-in. belt-driven vertical boring mills, 33 in. under cross rail and table.

One 42-in. motor-driven vertical turret lathe.

One motor-driven 400 ton wheel press to press 48-in. wheels.

Two motor-driven 28-in. heavy duty crank shapers.

One 24-in. heavy duty motor-driven crank shaper.

Eight 32-in. heavy duty belt-driven crank shapers.

Two 28-in. belt-driven upright drills.

Three 36-in. heavy duty motor-driven upright drills.

One double-spindle belt-driven high speed drill, capacity ½-in. holes in solid steel.

One single-spindle motor-driven upright drill, capacity up to 2-in. hole in solid steel.

One single-spindle belt-driven upright drill, capacity 1¼ in. in solid steel.

One double-head motor-driven staybolt threader to thread stay-bolts up to 30 in. long.

One belt-driven double-head bolt threader with one head to cut ⅝ in. to 1½ in. in diameter and other to cut from 1 in. to 2 in. in diameter.

One belt-driven pipe threading machine, capacity 2½ in. to 8 in.

One motor-driven serpentine shear, capacity to shear 10-gage sheets.

One motor-driven single end vertical punch with 30-in. throat and 1¼-in. stroke.

Two single end motor-driven horizontal-type punches with 12-in. gap, capacity 1-in. punch in 1-in. steel plate.

Two motor-driven combination punches and shears with 36-in. throat, capacity 1¼-in. hole in 1-in. steel plate, to shear plates up to ⅞-in. thick.

One motor-driven single end shear with 42-in throat.

One motor-driven tinner's square shear, capacity 16-gage iron 48-in. wide.

One belt-driven bending roll to roll sheets ½-in. x 120-in. wide.

Three hand bending rolls, to roll sheets 5/16-in. thick x 72-in. wide.

One motor-driven bending roll to roll ¼-in. sheets 120-in. wide.

One spring plate bending machine to form plates ⅝-in. x 3-in. up to and including ½-in. x 6-in. x 48-in. long.

Five motor-driven pedestal dry grinders with double end spindle to carry wheels 20-in. in diameter x 3-in. face.

Two belt-driven pedestal dry grinders with double end spindle to carry wheels 20-in. x 3-in.

Three motor-driven bench dry grinders with double spindle to carry wheels 12-in. in diameter x 1¼-in. face.

One motor-driven bench dry grinder with double-end spindle to carry wheels 14-in. in diameter x 1¼-in. face.

Two belt-driven vertical single-spindle grinders to grind radius on engine links from 24 in. to 100 in. and up to 5 in. thick.

One motor-driven universal grinder, swing 12 in. over bed and 48 in. between centers.

One belt-driven universal grinder, swing 12 in. over bed and 40 in. between centers.

Four belt-driven high speed power hack saws, capacity 6 x 6 in. steel bars.

One motor-driven high-speed power hack saw.

The Crane Co., Chicago, has ordered six Whiting tumbling barrels.

The city of Hammond, Ind., is taking bids through Wolf, Sexton, Harper & Trueax, 7 West Madison Street, Chicago, on a one-story superstructure for its waterworks, 63 x 92 ft., and a one-story boiler house, 50 x 80 ft., to cost $75,000.

The Edward H. Hansen Machine Co., recently incorporated with $15,000 capital stock for the manufacture of machinery for grinding, beveling, polishing, mitreing and drilling plate glass, has leased a one-story plant at 4518-22 Lexington Street, Chicago, with 5000 sq. ft. of floor space. The company has all the equipment it needs for the present. The officers are: President and general manager, Edward H. Hansen; vice-president, A. H. Anderson; secretary and treasurer, F. R. Anderson.

The Lavelle Foundry Co., Anderson, Ind., will erect an addition, 100 x 100 ft.

George Hiett and Harry Doty have bought the Electrical Supply & Construction Co., Spencer, Iowa. It has a well-equipped machine shop and also handles a full line of electrical supplies.

The Maquoketa Hydro-Electric Power Co., Maquoketa, Jackson County, Iowa, has been incorporated with 100,000 capital stock to construct a hydro-electric power plant. The incorporators include A. A. Hurst, W. L. Keck, J. E. Anderson, and others.

The Great Northern Railroad Co., Minneapolis, Minn., is having plans prepared for a new one-story machine shop and engine house on Taylor Street, to cost about $80,000. A. H. Hogeland is chief engineer.

The Crown Foundry Co., East Peoria, Ill., is arranging a list of equipment for installation at its new plant, for the manufacture of castings. It was organized recently.

A vocational department will be installed in the two-story junior high school to be erected at Aberdeen, S. D., 64 x 184 ft., estimated to cost about $175,000. The W. W. Beach Co., Warnock Building, Sioux City, Iowa, is architect.

The Swedish-American Radio Mfg. Co., Chicago, has leased the two-story building, including machine shop, at 1145-47 Diversey Boulevard, for the manufacture of wireless sets and equipment.

The Northern Pacific Railroad Co., St. Paul, Minn., will erect a new power plant at Glendive, Mont., to cost about $45,000.

The Fort Dodge Culvert & Steel Co., Fort Dodge, Iowa, is planning for the installation of new roughing mills and other equipment. Extensions will also be made in the power house.

A vocational department will be installed in the new high school to be erected at Evanston, Ill. The first section will cost $1,250,000 and the entire group, $2,500,000. W. F. Beardsley, principal of the local schools, is in charge.

A vocational department will be installed in the new two-story high school to be constructed at Imperial, Neb., estimated to cost about $150,000. Work has been commenced. A. T. Simmons, First National Bank Building, Bloomington, Ill., is architect.

The Velie Motor Corporation, Moline, Ill., has preliminary plans under way for extensions and improvements in its works. Increased capacity will be provided in the motor and motor parts departments.

The Colorado Springs Light, Heat & Power Co., Colorado Springs, Colo., has plans under way for extensions and improvements in its steam-operated electric power plant. It is operated by the United Gas & Electric Engineering Corporation, 61 Broadway, New York.

The City Council, Castle Rock, Colo., has plans for the construction of a municipal electric light and power house and distributing system.

The City Council, Colorado Springs, Colo., has tentative plans for the establishment of a hydroelectric power house at the Pikes Peak watershed, estimated to cost about $600,000, including transmission and distributing lines. George G. Anderson is engineer.

Philadelphia

PHILADELPHIA, May 1.

Bernard S. Pincus, 222 North Delaware Street, Philadelphia, has had plans prepared for a new cold storage and refrigerating plant at 454-58 North American Street. T. A. Stoutenburgh, Philadelphia, is architect.

Plans have been completed for a one-story power house and blower plant for the Bloch Go-Cart Co., 1136 North American Street, Philadelphia. W. E. S. Dyer, Land Title Building, is engineer.

The Philadelphia Suburban Gas & Electric Co., West Washington Square, Philadelphia, has arranged for a bond issue of $2,000,000, a portion of the proceeds to be used for extensions and improvements in electric power plants and system.

B. Luberman, Allegheny Avenue and Twentieth Street, Philadelphia, is arranging a list of equipment for installation at his machine shop.

The General Radio Corporation, Philadelphia, recently organized under Delaware laws with capital of $1,000,000 to manufacture wireless instruments and equipment, is arranging for the establishment of a local plant. Walter L. Eckardt, care Retail Merchants Bureau of the Chamber of Commerce, Twelfth and Walnut streets, is president and general manager.

Fire, April 27, destroyed two sections of the plant of the Fibre Container Co., Nixon and Fountain streets, Philadelphia, manufacturer of fiber cases and boxes, with loss estimated in excess of $500,000, including machinery. It is planned to rebuild.

A vocational department will be installed in the two-story high school to be erected at Jenkintown, Pa., estimated to cost about $225,000, and for which Heacock & Hokanson, 1218 Chestnut Street, Philadelphia, architects, have been commissioned to prepare plans.

The Lee Radio Corporation, Haddonfield, N. J., recently organized, has leased a portion of the local plant of the John E. Hand & Sons Co., manufacturer of nautical instruments, for a wireless instrument and equipment manufacturing works. Employment will be given to about 100 operatives. Mauntwell Van Rensselaer is president.

A vocational department will be installed in the new State School for the Deaf, to be erected by the State Board of Education, Trenton, N. J., at Trenton Junction. A power

house and pumping plant will also be built. Guilbert & Betelle, 546 Broad Street, Newark, are architects.

A one-story power house will be erected by the Campbell Soup Co., Camden, N. J., at its local factory.

The Neel-Cadillac Motor Co., 525 Market Street, Camden, with headquarters at 142 North Broad Street, Philadelphia, has plans under way for a two-story service and repair building, 80 x 175 ft., to cost about $75,000. Lackey & Hettle, 5 Hudson Street, are architects.

The Board of Education, Harrisburg, Pa., will soon take bids for a one-story power plant, 40 x 100 ft., estimated to cost $150,000. C. Howard Lloyd, Telegraph Building, is architect. D. D. Hammelbaugh, 121 Chestnut Street, is secretary.

The plant and machinery of the International Money Machine Co., Rockland Street and Kutztown Road, Reading, Pa., will be offered for sale, June 5 and 6, on the premises, by George C. Tenney and Edward C. Nolan, receivers.

Gehret Brothers, Bridgeport, Pa., operating a structural steel and iron works, have had plans prepared for a one-story addition, 120 x 200 ft., to cost about $50,000.

The Counties Gas & Electric Co., Ardmore, Pa., a subsidiary of the United Gas Improvement Co., Philadelphia, will build a new two-story electric power plant at Barbadoes Island, near Norristown, Pa., 100 x 200 ft.

A vocational department will be installed in the two-story and basement high school to be erected at Freeland, Pa., estimated to cost about $130,000. Ralph Herr, Simon Long Building, Wilkes-Barre, Pa., is architect.

Fire, April 24, destroyed the machine repair shop, garage and repair department and another building at the silk mill of the D. G. Dery Co., Allentown, Pa., with loss estimated at about $75,000, including machinery.

The Bailey & Powers Co., Troy, Pa., operating a gas and gasoline engine repair plant, manufacturer of parts, etc., is planning for the installation of new machine tools and other equipment.

A one-story power house will be erected at the new institution to be built at Dallas, Pa., by the Sisters of Mercy, estimated to cost about $400,000. James L. Morris, Coal Exchange Building, Dallas, is head of the building committee. F. Ferdinand Durang, 1220 Locust Street, Philadelphia, is architect.

The City Ice Co., Fourth and Dock streets, Easton, Pa., will take bids at once on separate contracts for a new two-story ice-manufacturing plant, 75 x 120 ft., on Dock Street. Van Rensselaer H. Greene, 35 Warren Street, New York, is engineer.

A vocational department will be installed in the new high school to be erected at Sinking Spring, Pa., to replace the school recently destroyed by fire.

Pittsburgh

PITTSBURGH, May 1.

The machinery and equipment market still is fairly active though strictly new requests for prices on cranes have been somewhat fewer than was the case recently. A new list of tools for the Western Penitentiary which calls for prices on eight metal-working and six wood-working machines has been issued and will remain open until May 9. The Penitentiary trustees recently closed on a list which, besides pulleys, grindstones and other supplies, included a wet tool grinder, drill, pipe-threading machine and a 20-in. x 12-ft. lathe. The Sharon Pressed Steel Co., Sharon, Pa., is in the market for a large die grinder. The P. H. Murphy Co., New Kensington, Pa., recently closed for two large presses, the order going to the Toledo Machine & Tool Co., through its Pittsburgh agency. A large Fay & Eagan saw was purchased by the American Bridge Co., for use in rebuilding the erecting shop at the Shiffler plant, Pittsburgh, recently destroyed by fire. Crane sales include two 7½-ton overheads to the Pittsburgh Malleable Iron Co., Pittsburgh, by Manning, Maxwell & Moore, Inc., and two 25-ton hand power overheads to the Buffalo General Electric Co., Buffalo, by the Northern Engineering Works, Detroit. The latter also has taken an order for an additional 1½-ton crane for the Pennsylvania Rubber Co., Jeannette, Pa.

The Cherry Tree Machine Co., Cherry Tree, Pa., manufacturer of cars and carwheels, is planning for the installation of new machinery. J. L. Stiffler is head.

The Penn Public Service Corporation, Johnstown, Pa., is disposing of a bond issue of $4,500,000, a portion of the proceeds to be used for power plant and system extensions and betterments. The generating plant of the Conemaugh Power Co., Seward, Pa., will be purchased. E. T. Hepburn is president.

The Butler-Buick Co., Butler, Pa., will commence the immediate erection of a three-story service building, with repair department, 85 x 110 ft., to cost about $150,000.

Overhead and locomotive cranes, machine tools, power equipment, chain hoists, brass conveyors, and other machinery will be offered at public sale by the Charlestown Industrial Corporation, Nitro, W. Va., May 22-26.

A vocational department will be installed in the new high school to be erected at New Martinsville, W. Va., estimated to cost $150,000.

The Bluefield Garage Co., Bluefield, W. Va., has awarded contract to the Oscar Mitchell Co., Bluefield, for a three-story garage, with machine repair department.

The Pittsburgh & Lake Erie Railroad Co., Pittsburgh, will take bids until May 9 for all requirements of air brake repair equipment until Jan. 1, 1923. C. M. Yohe is assistant purchasing agent.

A vocational department will be installed in the new high school to be erected at Warren, Pa., estimated to cost in excess of $500,000.

The Seward Wire Co., New York, headed by Thomas J. Seward, 17 West Forty-second Street, New York, engineer, has plans under consideration for a new factory at Parkersburg, W. Va., to manufacture insulated and other wire products. It will be one-story, 80 x 200 ft.

C. C. Surface, Richwood, W. Va., is planning for the establishment of a factory to manufacture metal toys and novelties.

New England

BOSTON, May 1.

Little if any improvement is noted in the movement of machine tools in this territory. Many prospects, hanging fire for weeks, apparently are as far from closing as when quotations were asked for. Going business is largely confined to used equipment, buyers still being of the opinion that prices for new tools have not reached bottom notwithstanding the advance in pig iron. Used machinery dealers are meeting stiff competition, however, from defunct manufacturers and others wishing to dispose of part of their equipment who are making personal offers to prospects. This method of disposing of equipment instead of by public auction is causing considerable comment. Western machine-tool builders are in this market to secure business from manufacturers of radio equipment, but so far have had little success. Radio parts makers apparently want little large equipment. The use of die castings in this industry is extensive, and the practice of wire binding in place of threading cuts is common. Manufacturers, therefore, as a rule are interested largely in taps, dies and bench turning and milling equipment.

Sales of used equipment the past week include one universal milling machine to a Lewiston, Me., textile mill repair shop; one 16-in. lathe to a Boston automobile repair shop; four 25-in. upright drills to a western Massachusetts manufacturer who also bought a small turning tool; a plain automatic screw machine, a surface grinder and a 14-in. x 6-ft. lathe to a Lynn manufacturing interest; one 20-in. drill to a Cape Cod manufacturer of stoves, and about 15 miscellaneous machines. New equipment sales include one 24-in. geared head Bradford lathe to a New Bedford, Mass., interest and an 18-in. lathe of the same make to a Lewiston textile machinery repair shop; one 30-in. x 30-ft. lathe to a Maine paper mill; squaring shear equipment to a Leominster concern, and a 15 ton, 30-ft. span hand crane to the Danvers Bleachery, Peabody, Mass.

Bids will close early this week on electrical hoist wagon derrick equipment wanted by the Boston Transit Commission, 1 Beacon Street, Boston. A Vermont concern is inquiring for one 20-ton and one 40-ton crane.

Other inquiries are for one No. 4 Cincinnati milling machine, one 16-in. x 8-ft. Walcott screw cutting engine lathe and one 16-in. Walcott crank shaper, all used tools, from the Humphrey Machine Co., Keene, N. H. A Massachusetts manufacturer has revived his inquiry, originally put out two years ago, for a large horizontal forcing press, and a central Massachusetts manufacturer is negotiating with a local firm on a fairly large list of presses.

The Butts & Ordway Co., 33 Purchase Street, Boston, heavy hardware, is installing used bending and cutting equipment for concrete bar work at its Moore Street, South Boston, warehouse.

Plans are completed for a one-story, 120 x 200 ft., manufacturing unit and basement, a 20 x 100 ft. storage building and a garage for the National Can Co. at Locust and Von Hillern streets, Dorchester, Boston. Eventually two additional stories will be added to the manufacturing unit. Approximately $80,000 will be spent for machinery and equipment.

The Gale-Sawyer Co., Boston and South Weymouth, Mass., toolmaker, will pass out of existence. Mr. Gale will re-enter the printing business. George O. Crawford, who has been associated with the company for some time, will operate the South Weymouth plant as the Crawford Machine Co., and will make automobile parts. Much of the machine tool equipment will be sold privately.

The Gillespie Eden Corporation, Lowell, Mass., washing machines, will move its business to New Jersey within the immediate future, according to present plans.

Plans are complete for a one-story and basement addition 20 x 120 ft., and a small blacksmith shop, for the Foster Machine Co., Westfield, Mass.

A vocational department and power house will be installed in the new three-story high school to be erected at Hartford, Conn., estimated to cost in excess of $1,200,000.

Fire, April 28, destroyed the plant of the Victor Last Co., Lynn, Mass., manufacturer of iron shoe lasts, etc., with loss reported at $40,000, including equipment.

The New England Oil Refining Co., Fall River, Mass., operating a local tidewater refining plant and with distributing plant at New Bedford, Mass., has disposed of a bond issue of $1,000,000, the proceeds to be used in part for extensions and betterments. F. Douglas Cochrane is chairman of the board.

The Johnson Marble Co., 52-70 First Street, Cambridge, Mass., is planning to rebuild its plant, the installation to include new finishing and polishing machinery, hoisting and conveying equipment, etc.

The American Radio & Research Co., Medford Hillside, Medford, Mass., manufacturer of wireless instruments and equipment, is completing plans for a one-story addition to cost about $30,000.

The Basin Quarries, Inc., Portland, Me., recently organized, is planning for the equipment of works on property at Phippsburg, Me., comprising over 100 acres of feldspar lands. Crushing, grinding and sorting machinery will be installed. Joseph F. Perry heads the company.

The New England Tube & Stamping Co., Inc., West Haven, Conn., recently organized with a capital of $200,000, has taken over the plant of the Coe-Stapley Co., for the establishment of a new works to manufacture metal tubing, sheet metal products, etc. P. J. Holdsworth and J. M. Harding, 178 Lawrence Street, New Haven, Conn., head the company.

The Penobscot River Co., Bangor, Me., recently organized, has plans under way for a hydroelectric generating plant on the Rockabema River, vicinity of Howland, Me., for light and power service in this district, estimated to cost in excess of $100,000.

The Century Machine Co., Holyoke, Mass., manufacturer of dish-washing machines and parts, is perfecting plans for a reorganization, to include increased capitalization for plant expansion.

The Turners Falls Power & Electric Co., Turners Falls, Mass., has made application to issue bonds for $3,000,000, a portion of the proceeds to be used for plant extensions and improvements.

Buffalo

BUFFALO, May 1.

The Sterns Electric Equipment Co., 66 Broadway, Buffalo, will take bids at once for a two-story plant, 50 x 70 ft., at the rear of Broadway and Oak Street. Julius Schultz, 1370 Main Street, is architect.

The Queen City Plating Works, 103 Sycamore Street, Buffalo, manufacturer of metal specialties, is considering the construction of a new plant at 566 Michigan Avenue.

The Charles S. Burkhardt Co., Buffalo, has preliminary plans under way for a seven-story garage and service building at Church Street and Delaware Avenue.

The Maxwell Steel Vault Co., 4 Warner Street, Oneida, N. Y., has awarded contract to Frazio & Millard, Oneida, for the first unit of a new plant, 60 x 90 ft.

The North East Electric Co., 348 Whitney Street, Rochester, N. Y., manufacturer of electric starting systems, etc., is planning for the installation of new equipment.

The Gypsolite Co., Buffalo, recently organized under Delaware laws with capital of $1,000,000 to operate gypsum properties, has plans under way for a new one-story plant for crushing, grinding, etc., at Batavia, N. Y., to cost about $90,000 with machinery. J. F. H. Haggerty, 66 Bedford Avenue, Buffalo, is president.

A vocational department will be installed in the new two-story and basement high school to be erected at Clarence, N. Y., 50 x 130 ft. Herbert G. Swain, 52 West Chippewa Street, Buffalo, is architect.

The Governeur Marble Quarries, Govereneur, N. Y., are planning for the installation of new hoisting and other equipment. J. H. O'Brien is head.

The Webster Fruit Growers' Co-Operative Association, Webster, N. Y., has plans under way for a four-story cold storage and refrigerating plant and packing house, 90 x 110 ft., to cost about $150,000. In addition to cold storage machinery, the installation will include conveying and loading machinery. George W. Dunn, Lake Road, is in charge.

The Progressive Machine Co., Falconer, N. Y., has leased a new two-story building, 50 x 125 ft., to be erected on East Main Street by C. J. Wilcox, Ashville.

The Gould & Gould Mfg. Co., 732 Cooper Street, Watertown, N. Y., manufacturing jeweler, is planning for the installation of new precision machinery and special tools. R. D. Gould is head.

A vocational department will be installed in the new high school to be erected at Geneva, N. Y., estimated to cost about $400,000.

The Niagara Spraying Co., Middleport, N. Y., is considering the erection of a one-story building, 50 x 200 ft. Later another structure of the same size will be built. George F. Thompson is head.

The Smith-Lee Co., Oneida, N. Y., manufacturer of bottle caps, etc., has awarded contract to the General Erecting Co., 105 Mary Street, Syracuse, N. Y., for a two-story addition, 45 x 220 ft., estimated to cost $55,000, including equipment.

The A. W. Jack Corporation, Lockport, N. Y., will soon take bids for the first unit of its new plant, to be one-story, 130 x 500 ft., and estimated to cost $400,000, with machinery. It will be used for the manufacture of asbestos products. George F. Hardy, 309 Broadway, New York, is engineer. A. W. Jack is president.

W. G. Day, 2120 Fillmore Avenue, Buffalo, manufacturer of automobile radiators, etc., is planning for the installation of new metal-working equipment.

W. H. Miner, Chazy, N. Y., has completed plans for a new one-story electric power plant to cost about $45,000.

Baltimore

BALTIMORE, May 1.

The Western Maryland Railway, Baltimore, has asked for bids on the construction of additional repair shops at Port Covington, Baltimore.

The Mebane Wrench Co., 123 Second Street, Newton, N. C., will establish a plant to manufacture an auto-locking adjustable wrench. C. H. Mebane, Jr., is general manager.

Lyon, Conklin & Co., Inc., 13 Balderston Street, Baltimore, manufacturer of roofing, heating supplies, etc., is building a plant at Race and Donaldson streets which will have about 100,000 sq. ft. of floor space. Edgar Lyon is president.

The Maryland Motors, Inc., 601 St. Paul Street, Baltimore, is completing plans for a three-story service and repair building at 414-20 North Calvert Street, to cost approximately $75,000. A machine shop will be installed.

A power house will be constructed by the Louis H. Wiebel Co., Hagerstown, Md., in connection with rebuilding the portion of its turned-wood specialty plant, recently destroyed by fire.

The Common Council, Belhaven, N. C., has plans under way for enlargements in its municipal electric plant to double the present capacity. New equipment will be installed, including engine, generator and switchbbard. William C. Olson, Kinston, N. C., is consulting engineer.

A vocational department will be installed in the new high school to be erected at Lynchburg, Va., with first unit estimated to cost $150,000, and complete school $250,000.

The Owens Motor Co., 2100 West Broad Street, Richmond, Va., is planning for the installation of a new lathe, bench tools and other equipment at its repair shop.

The Bureau of Supplies and Accounts, Navy Department, Washington, is taking bids until May 23 for two direct-action, steam-driven vacuum pumps, for air and water removal from 60,000 sq. ft. of radiation, at the naval base, San Diego, Cal., as specified in schedule 9616; and until May 9 for one 25-kw., 60-cycle transformer for the Washington navy yard.

The Bureau of Yards and Docks, Navy Department, Washington, will take bids until June 7 for a machine shop at the Naval Operating Base, Pearl Harbor, T. H., as set forth in specification 4518. L. E. Gregory is chief.

A vocational department will be installed in the three-story high school, 110 x 170 ft., at Norview, Va., estimated to cost about $100,000. Charles M. Robinson, Times-Dispatch Building, Richmond, Va., is architect.

The Office of the Chief of Air Service, Munitions Building, Washington, will take bids until May 8 for one motor-

driven patternmakers' lathe; one motor-driven surface machine; one motor-driven speed lathe; one motor-driven band saw, filer and setting machine, all as specified in Circular 67.

The Lowenberg-Goodman Corporation, 127 Granby Street, Norfolk, Va., is taking bids for the erection of a two-story automobile service building, 90 x 305 ft., with machine repair department, estimated to cost about $150,000. Calrow & Wrenn, New Monroe Building, are architects.

The Bureau of Yards and Docks, Navy Department, Washington, is taking bids for a new power house at Yorktown, Va., under specification 4565.

A vocational department will be installed in the new Handley School group, Winchester, Va., estimated to cost $600,000, bids for which will be asked early in May. Walter H. McCormack, Cleveland, is architect. Stewart Bell is head of the local school board.

The Weyers Cave Light & Power Co., Staunton, Va., is planning for the construction of a new electric light and power plant.

The Public Electric Light Co., St. Albans, Va., is planning for the erection of a new electric power house on the Kanawha River. A stock issue is being arranged to provide funds.

The Cumberland Sales & Service Station, Cumberland, Md., is completing plans for a one-story service building, with machine shop, 100 x 150 ft., to cost about $100,000.

A vocational department will be installed in the two-story and basement high school to be erected at West Hickory, N. C., 130 x 175 ft., estimated to cost about $80,000. Benton & Benton, Fidelity Building, Nilson, N. C., are architects.

A. P. Weathers, Shelby, N. C., is organizing a company with a capital of $40,000 to erect an ice-manufacturing and cold storage plant.

C. E. Booth, Jr., 916 West Broad Street, Richmond, Va., operating a machine works, is making inquiries for lathes, a drill press, and hand tools.

The Standard Electric Machinery Co., 7 East Hill Street, Baltimore, is in the market for a 300 to 500-kw. generator, three-phase, 60-cycle, with exciter and switchboard panel, for water wheel connection.

A vocational department will be installed in the new high school to be erected at Abbeville, S. C., to cost about $100,000, for which plans have been completed by G. Lloyd Preacher & Co., Healey Building, Atlanta, Ga., architects.

Milwaukee

MILWAUKEE, May 1.

More real progress toward better machine-tool business was made in April than in any of the last 18 to 24 months. Sales the past month were larger than in any similar period for at least six months and are generally reported to have been in excess of the same month in 1921. It is true that volume is lacking still, but the spotty course of business is gradually being ironed out. Prospects for May are regarded as good, inquiry in the past two weeks especially reaching a stage of fair activity. Automotive industries are again substantial buyers, with steadily increasing needs appearing. Local foundries are calling for skilled help more persistently, although semi-skilled labor is plentiful.

The Winther Motors, Inc., Kenosha, Wis., which erected a new factory group costing $250,000 the past year, following the consolidation of the Winther Motor Car Co., Kenosha Wheel & Axle Co. and Marwin Truck Corporation, will place the new plant in operation immediately. It has taken an order valued at $2,000,000 calling for 1000 taxicabs, complete, for the Universal Motor Owners, Inc., Chicago, for delivery between June 1 and Dec. 31. Martin P. Winther is president and general manager.

The International Stamping Co., Hartford, Wis., has been incorporated with a capital stock of $50,000 by A. G. Laubenstein, local, who has purchased the entire plant, equipment and business of the International Steel Products Co. at private liquidation sale for $12,000. Frank Strubing is retained as factory manager. The company, originally formed to manufacture silencers or mufflers for gas engines and motors, will under the new ownership manufacture sheet metal stampings, both as a jobber and maker of specialties. Present equipment needs are negligible, but some small purchases will be made from time to time.

The Bullard Mfg. Co., Madison, Wis., organized about eight months ago to manufacture piston rings and similar gas engine specialties, has moved its factory and office from 1970-1984 Helena Street to the works of the Madison Tool & Stamping Co., to provide for expansion. The capacity is being increased to 5000 rings daily, with an output of 10,000 in prospect within 60 days to meet demands. Earl J. Bullard is president and general manager.

The Kunde-Rundle Co., Milwaukee, has been incorporated with a capital stock of $20,000 to engage in the general structural, architectural and ornamental iron fabricating business and the manufacture of steel building materials and supplies. The principals are W. A. Kunde, 3114 Vine Street; Edwin K. Rundle, 1217 Twenty-fifth Street, and H. S. Lawrence. Mr. Rundle is president Western Machine Co., 248 Fourth Street. A shop will be leased and equipped, but further details are not yet available.

The Oshkosh Steel Construction Co., Oshkosh, Wis., has plans for a new shop and office building, 95 x 152 ft., two stories and part basement, at 35-37 Jackson Street. An investment of about $50,000 is planned. E. L. Mundin is president.

The American Brass Co., which has been merged with the Anaconda Copper Co., will delay enlargement of its plant in Kenosha, Wis., according to a statement issued from Kenosha by B. B. Thayer, New York, vice-president, who inspected the plant on the return from a visit to the Western mines and other interests. As soon as demand increases sufficiently, a wire mill will be added to the Kenosha plant by converting a building now used for storage.

Krisor Brothers, 772 Milwaukee Avenue, Kenosha, Wis., have started work on a new $25,000 garage and service building, 60 x 109 ft., part two stories and basement, designed by Joseph Lindl, local architect.

Martin Rasmussen, Racine, Wis., machinist and designer, is organizing a company to manufacture a new type of metal and wood-working tool for pattern shops, continuation schools, etc. Its principal purpose is to reproduce work or carving patterns from blueprints. It may also be used as a boring machine, key-seater, etc.

The Huron Portland Cement Co., Detroit, has acquired a site with 600 ft. frontage on the Burnham Canal at Sixth Avenue, Milwaukee, for a new receiving, warehousing and shipping plant to serve the Northwestern territory. An investment of $250,000 or more in concrete docks, warehouses, conveyor buildings, offices, etc., is planned.

The Board of Education, Superior, Wis., will close bids May 5 for the erection of the Webster Memorial Building, a vocational training institute, as an addition to the Central high school. It will cost about $150,000. The architects are Radcliffe & Broomhall, local.

The U. S. Tractor & Machinery Co., Menasha, Wis., expects to let contracts about May 15 for the erection of a new gray iron foundry to cost about $50,000, and extensions to the machine shop and assembling floor. It has placed a new issue of $250,000 in first mortgage bonds to cover the improvements and accommodate the growth of the business. J. M. Robinson is president and general manager.

Indianapolis

INDIANAPOLIS, May 1.

The Standard Steel Car Co., Hammond, Ind., has awarded a contract to the Austin Co., 208 South La Salle Street, Chicago, for a one-story addition to cost about $100,000. Headquarters of the company are in the Frick Building, Pittsburgh.

The Town Clerk, Paragon, Ind., will receive bids until May 31, for a municipal electric power house and distributing system for light and power service. C. M. Bowman is town clerk.

The L. A. Althoff Mfg. Co., La Porte, Ind., manufacturer of mechanical specialties, is planning for the installation of new equipment.

The Ford Motor Co., Detroit, is reported to be negotiating for a site on the Indiana Harbor ship canal, Hammond, Ind., for the erection of a large foundry to manufacture iron and steel castings. It is said that the plant will employ more than 2500 men.

A vocational department will be installed in the two-story and basement high school to be erected at Cayuga, Ind., estimated to cost about $90,000. Johnson, Miller & Miller, Terre Haute, Ind., are architects.

The Icenomor Electric Refrigerator Co., Evansville, Ind., manufacturer of electrically operated refrigerators, has leased the building formerly occupied by the Shimer Wire & Steel Co., for extensions. It is proposed to double the present production.

Loading and unloading machinery and other conveying machinery, elevators, etc., will be installed in the four-story warehouse to be built at Kentucky Avenue and Sand Street, Indianapolis, by the Central Public Warehouse Co. The initial unit, upon which work will commence at once, will aggregate about 90,000 sq. ft. and cost $200,000; the entire plant will exceed 200,000 sq. ft., and cost $500,000, with equipment. I. C. Strohm is president.

The Studebaker Corporation, South Bend, Ind., will erect

a four-story building, 76 x 620 ft., to cost $500,000. It will be devoted mainly to handling its foreign business.

An explosion of a tank of gasoline caused a fire at the plant of the Wanner Malleable Iron Co., Hammond, Ind., April 24, which resulted in a loss of $80,000. The buildings destroyed were the soft rolling mill, the assembling and shipping departments.

Detroit

DETROIT, May 1.

The Auto Specialty Mfg. Co., St. Joseph, Mich., has revised plans under way for its new one-story plant to manufacture automobile equipment, estimated to cost about $100,000. Davidson & Weiss, 53 West Jackson Boulevard, Chicago, are architects.

The Duplex Printing Press Co., Battle Creek, Mich., is planning for enlargement in its machine shops and foundry to double, approximately, the present output. It will add to its line of presses, manufacturing new units for printing catalogs, magazines, etc. A bond issue of $750,000 has been sold, the majority of the proceeds to be used for the expansion.

The Department of Motor Transportation, Detroit, will soon commence the erection of the superstructure of its new three-story garage, service and repair plant, 260 x 450 ft., for municipal cars and trucks. It will cost about $600,000, including machinery.

The Silk City Concrete Co., Belding, Mich., recently organized, will establish a plant for the manufacture of concrete building products. Louis L. Parney is president, and E. B. Lapham, secretary and treasurer.

The F. Joseph Lamb Co., 1938 Franklin Street, Detroit, manufacturer of precision tools, gages, etc., is planning for the installation of new equipment at its machine shop, including small motors.

The Baker-Perkins Mfg. Co., 1204 Niagara Street, Saginaw, Mich., has awarded a contract to James S. Kerns & Son, 207 Third Street, for a one-story machine shop, 100 x 400 ft., to cost about $150,000.

The Gulf States

BIRMINGHAM, May 1.

The Armstrong Steel Co., Fort Worth, Tex., recently organized with a capital of $2,500,000, has taken over the iron and steel works of the George W. Armstrong Co. for $1,250,000. Plans are under way for extensions, to include a foundry, pipe mills, cotton tie mills, and other structures. Manufacture, for the larger part, will be devoted to oil well machinery and parts. George W. Armstrong, head of the former Armstrong company, will be prominent in the new organization.

The City Council, Evergreen, Ala., will build a one-story addition to its municipal electric power plant and will install new engine-generator sets, pumping machinery, boilers, switchboard and auxiliary apparatus. W. W. Hill, Auburn, Ala., is consulting engineer.

The Louisiana Oil Refining Corporation, Shreveport, La., has leased the refinery of the International Oil & Gas Corporation, Cedar Grove, La., and will make extensions to bring the plant up to a maximum output of 1000 bbl. of crude oil daily.

The Western Gears & Parts Co., Dallas, Tex., manufacturer of automobile springs, gears, parts, etc., is planning for enlargements and improvements in the present works. W. B. Connell is engineer in charge.

The Weatherford Refinery, Inc., Weatherford, Tex., recently reorganized with a capital of $200,000, has plans under way for extensions and improvements. New equipment will be provided.

The Southern Dry Dock & Shipbuilding Co., Orange, Tex., is planning to rebuild its machine shop lately destroyed by fire with loss approximating $23,000.

The Treasury Department, office of the supervising architect, Washington, will take bids until May 18 for the mechanical equipment for the power house at the United States Veterans' Hospital, Gulfport, Miss. James A. Wetmore is acting supervising architect.

The Moco Monkey Grip Co., Oklahoma City, Okla., has acquired the plant of the Texas Motor Car Association, Fort Worth, Tex., for $295,000 and will equip the plant for the manufacture of automobile tires.

Fire, April 25, destroyed a portion of the car and locomotive repair shops of the Tampa & Jacksonville Railroad Co., Gainesville, Fla., with loss estimated at $50,000, including equipment.

The Southwest Pulp & Paper Co., Monroe, La., has acquired about 18 acres on the Monroe-Columbia highway as a site for a new paper and pulp mill, estimated to cost about $250,000, including machinery.

The St. Bernard Growers' Ice Mfg. Co., Violet, La., has preliminary plans for a new ice-manufacturing plant, estimated to cost in excess of $80,000. Leon A. Meraux is president.

A vocational department will be installed in the new high school to be erected at Sealy, Tex., bids for which are being received until May 10. Alfred C. Finn, Foster Building, Houston, Tex., is architect.

The Common Council, Fort Meade, Fla., is planning for the immediate construction of a municipal electric light and power house.

The United States Engineer Office, room 329 Custom House, New Orleans, will receive bids until May 11 for a turbo-generator, motor, switchboards, controllers, and other electrical equipment for the United States pipe line dredge "Gulfport."

Fire, April 22, destroyed a portion of the plant of the Bibert, Vancroft & Ross Foundry & Machine Works, New Orleans, with loss estimated at $100,000, including equipment.

A vocational department will be installed in the new high school to be erected at Amarillo, Tex., estimated to cost about $150,000. Parker & Rittenberry are architects.

The Common Council, Winnsboro, La., has plans nearing completion for a municipal power plant, to be used in connection with the waterworks system. X. A. Kramer, Magnolia, Miss., is engineer.

A vocational department will be installed in the new high school to be erected at Nocona, Tex., for which plans have been prepared by Eads & McCune, Duncan, Okla., architects.

Fire, April 17, destroyed a portion of the mill of the Everglades Cypress Co., Loughman, Fla., with loss estimated at close to $150,000, including machinery and stock.

The automobile mechanics school building at the plant of Loyola University, New Orleans, was partially destroyed by fire April 28, with loss of about $50,000, of which approximately $20,000 represents machinery.

The Central South

ST. LOUIS, May 1.

The American Auto Radiator Co., Eighteenth and Cherry streets, Kansas City, Mo., has acquired a site and has preliminary plans for the erection of a new one-story factory. Alvin B. Gunther is head.

The Johnson Automobile Co., 3667 Olive Street, St. Louis, has awarded a contract to Gillespie & Daly, International Life Building, for a two-story service and repair works, 50 x 52 ft., estimated to cost approximately $50,000. William P. McMahon, Title Guaranty Building, is architect.

The City Council, Paris, Mo., is planning for extensions and improvements in the municipal electric power plant to cost about $40,000.

Fire, April 19, destroyed a portion of the works of the Covington Mfg. & Auto Co., East Liberty and Maple streets, with loss estimated at about $25,000, including equipment.

The National Lead Co., 722 Chestnut Street, St. Louis, is arranging for the installation of a punch press, shear, air compressor and other apparatus. W. M. Lowry is in charge of purchases.

The proposed addition to the municipal electric light and power plant at St. Joseph, Mo., to cost about $300,000, will be held in abeyance by the City Council. A bond issue in the amount noted was defeated at a recent special election.

The Home Ice & Cold Storage Co., Atchison, Mo., has been acquired by new interests, who have preliminary plans for extensions in the ice-manufacturing plant and the installation of new equipment.

F. L. Cornwall, La Salle Building, St. Louis, is planning for a new one and two-story automobile service building, with repair shop, 40 x 130 ft., to cost close to $80,000.

The Iron Exploration Co., Poplar Bluff, Mo., a subsidiary of the St. Louis Coke & Chemical Co., Granite City, Ill., is planning for the installation of an aerial tramway at its local property, and new washing plant. A crushing plant is being considered for later erection.

The Common Council, Rush Springs, Okla., has plans under way for extensions and improvements in its municipal electric power plant, recently acquired, to include the installation of new machinery. H. G. Olmsted & Co., Tradesmen's National Bank Building, Oklahoma City, Okla., are engineers.

A. H. Bockhaus Newton, Kan., will soon break ground for a new one-story and basement machine shop at 119 East

Third Street, estimated to cost in excess of $19,000, including equipment.

W. B. Collier, Painesville, Ohio, is perfecting plans for the operation of the plant of the Harvey Steel Products Co., Jackson, Tenn., recently acquired for about $100,000. Extensions and improvements will be made and new equipment installed as required.

Swift & Co., United Stock Yards, Chicago, have had plans prepared for a one-story and basement cold storage plant, 50 x 145 ft., at Enid, Okla., estimated to cost $25,000, exclusive of equipment.

A vocational department will be installed in the new two-story high school at Purcell, Okla., estimated to cost $75,000. A bond issue is being arranged.

The United States Rubber Co., Akron, Ohio, has leased an eight-story building at Kansas City, Mo., for the establishment of a new factory branch.

The Oklahoma Producing & Refining Co., Muskogee Okla., will build an addition to its local oil storage and distributing plant, estimated to cost about $250,000.

The Iron Mountain Co., Ironton, Mo., is planning for the installation of a new crushing and separating plant, estimated to cost $500,000, including machinery.

The Poplar Bluff Rubber Co., Poplar Bluff, Mo., recently organized with a capital of $100,000, is perfecting plans for a new works, estimated to cost $60,000, to manufacture automobile tires. J. J. Wehlgemuth Maplewood Post Office, St. Louis, heads the company.

A one-story addition will be constructed at the power house of the National Biscuit Co., Main and Jule streets, St. Joseph, Mo., estimated to cost about $70,000, including improvements in other portions of the plant.

The Associated Motors Corporation, Louisville, is perfecting plans for a merger with the Kentucky Wagon Mfg. Co. The consolidated company will have a total capitalization of $50,000,000, and plans for increased facilities for the manufacture of motor trucks and automobiles.

The Knoxville Railway & Light Co., Knoxville, Tenn., is planning for extensions in its electric power plant and system to cost about $150,000, including equipment.

The Cherokee Motor Co., Knoxville, Tenn., has leased a four-story building for the establishment of a new service and repair works. It will be remodeled and improved and equipment installed. Claude S. Reeder is president.

The Universal Car Co., 2228 Oak Street, Louisville, will erect a new one-story service and repair works to cost about $40,000. W. C. Martin is president.

Cincinnati

CINCINNATI, May 1.

The tone of the market is undoubtedly better, but in actual business the improvement is not so noticeable. Inquiries continue at a good rate, but bookings still lack volume. Small tools are in demand, however, and manufacturers report a fair amount of business. The Pollak Steel Co. has placed an order with a Buffalo concern for a large boat cutter. On this deal competition developed from a German manufacturer. The International Nickel Co., Huntington, W. Va., was a purchaser in this market, taking two milling machines and a large planer. The Big Four Railroad has issued an inquiry for four tools for its Kankakee, Ill., shops, and has withdrawn for the time being an inquiry for equipment for its Beech Grove, Ind., shops. The Ohio Cash Register Co., Dayton, is understood to have purchased several tools, and the Delco Light Co. is preparing a list of equipment on which it will take bids shortly. There has been little railroad buying, although one manufacturer received an order for a single machine from an Eastern road. Used tools are moving in fair volume and it is said that the supply of good used tools on the market is diminishing rapidly.

The National Pump Co., Springfield, Ohio, has been organized to manufacture self-serve gasoline pumps. It has contracted with the Thompson Grinder Co. to make all the pumps at its Springfield plant and will also have offices in the same building. F. D. Strickler is president.

Sale of the property of the Allen Motor Co., Columbus and Bucyrus, Ohio, scheduled for April 20, has been postponed until June 6. No formal bid was received, although a number of bidders were present from Chicago, Detroit, Cleveland and Toledo. The Federal court has fixed an upset price of $500,000 on the property, with $25,000 required to accompany each bid.

The William Koehl Box Co., Hulbert Street, Cincinnati, has awarded contract to the Ferro-Concrete Construction Co. for a four-story reinforced concrete factory, 50 x 100 ft., to cost approximately $50,000. New machinery will be installed.

The Dayton Power & Light Co., Dayton, Ohio, will soon take bids for the superstructure of a new steam-operated electric power plant at Millers Ford, estimated to cost close to $2,000,000, including equipment. Thomas E. Murray, Inc., 55 Duane Street, New York, is engineer.

E. H. Huffman & Sons, 243 South Fourth Street, Columbus, Ohio, are planning for the installation of a lathe, drill press, grinding machine and other equipment at their automobile service works.

Cleveland

CLEVELAND, May 1.

Machinery sales during April showed a fair gain over March and the outlook has further improved since the beginning of last month. Machine tool builders report a better volume of orders and inquiries. A local manufacturer of automatic screw machines the past week booked an Eastern order for 15 to 18 machines and sold 12 machines to a Central Western automobile manufacturer. The recent improvement in demand for turret lathes is fair, although orders are mostly for single machines and come principally from automobile companies and brass manufacturers. No railroad buying is reported.

Dealers report a fair volume of sales, mostly for small tools, with few orders for more than one or two machines. Orders for machine repair parts show a marked increase as a result of improved operations in many manufacturing plants. No orders have been placed against the several school lists that are pending. The Ohio Western University, Delaware, Ohio, is planning to purchase three 16-in. lathes and a hack saw, and in wood-working equipment a saw bench, jointer and buz planer. However, this equipment will not be purchased for several months.

The William B. Duck Co., 224 Superior Street, Toledo, Ohio, has leased a factory at Spielbusch and Shepherd streets for the manufacture of radio equipment.

The Canton Rim Co., Canton, Ohio, has purchased the plant of the F. R. Fortune Tool Co., Wooster, Ohio, which has been in the hands of a receiver. It will be enlarged. The plant of the Canton Rim Co., at Louisville, Ohio, was burned a few weeks ago.

The stockholders of the United Roll & Foundry Co., Ravenna, Ohio, have voted to sell the plant to the Ravenna Steel Co., which will manufacture specially designed steel reinforcing material for road construction work.

The Dayton Malleable Iron Co., Dayton, Ohio, will resume operations this week in its Canton plant, purchased some time ago from the Timken Detroit Axle Co. It will manufacture malleable iron castings which will be sent to the company's other plants for machine work. D. C. Flint is general manager at Canton.

The Fox Furnace Co., Elyria, has placed contract for the erection of a $14,000 factory addition.

The Northern Ohio Traction & Light Co., Akron, Ohio, has arranged an appropriation of $1,000,000 for extensions and improvements in power plants and system.

A vocational department will be installed in the new high school to be erected at Deshler, Ohio, estimated to cost about $120,000.

Lewis Jones and William Cookson, Kansas, near Fostoria, Ohio, are organizing a company to construct and operate a local electric power plant and system. Work on the station will be commenced at an early date.

A vocational department will be installed in the new high school to be constructed at Louisville, Ohio, estimated to cost about $225,000. Thayer & Johnson, 5716 Euclid Avenue, Cleveland, are architects.

Machine Tool Exposition

While a machine tool exposition held by a dealer is not entirely new, an exhibit held by the Cleveland Tool & Supply Co., Cleveland, last week was claimed to be the most complete exposition exclusively devoted to machinery and tools ever conducted by a distributor of machinery and factory supplies. The exposition started Wednesday, continuing through the remainder of the week, and it is estimated that close to 2000 men directly interested visited it, in addition to a large number of boys from the Cleveland technical schools, who were welcomed at certain hours.

The machinery exhibit included a large number of machine tools of latest types made by the manufacturers for whom the company is the selling representative, and factory experts were on hand to demonstrate the machines, some of which were under power. There were also special displays of tools and various other lines of mill supplies, and factory representatives were on hand to supply information regarding their products.

The exhibit throughout was educational and aroused much interest among the visitors, which included shop superintendents, foremen and plant executives, who came to gain information regarding labor-saving equipment that could be used to advantage in their plants. In addition to machinery, there were exhibits of grinding disks, grinding wheels, twist drills, machine cutters and hobs of various kinds, hoists, tramrails, gages, belting, belt lacing, seamless steel tubing, glue heaters and other factory supplies.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined iron bars, base price	2.48c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.48c.
Hoops, base price	3.38c.
Bands, base price	2.98c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.58c.
Channels, angles and tees under 3 in. x ¼ in., base	2.48c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.50c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.70c.
Toe-calk, ½ x ⅜ in. and larger	3.20c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.50c. to 6c.
Shafting and Screw Stock:	
Rounds	3.35c.
Squares, flats and hex	3.85c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.58c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.38c. to 3.53c.
No. 12	3.43c. to 3.58c.
No. 14	3.48c. to 3.63c.
No. 16	3.53c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.25c.
No. 26	3.90c. to 4.15c.	4.30c.
No. 28	4.00c. to 4.25c.	4.40c.
No. 30	4.25c. to 4.50c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—56	—40	¾ in. Butt	—30	—13
¾ in. Butt	—61	—47	1½ in. Butt	—32	—15
1-3 in. Butt	—63	—49	2 in. Lap	—27	—10
3½-6 in. Lap	—60	—46	2½-6 in. Lap	—30	—15
7-8 in. Lap	—56	—34	7-12 in. Lap	—23	— 7
9-12 in. Lap	—55	—33			

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16 c. to 16½c.
High brass wire	16¼c. to 17 c.
Brass rod	13¾c. to 14¼c.
Brass tube, brazed	22½c. to 23 c.
Brass tube, seamless	18 c. to 19 c.
Copper tube, seamless	20¾c. to 21¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19¼c. to 20¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb.	$6.05	$5.80
			90 lb.	6.15	5.90
			100 lb.	6.25	6.00
IC	$10.00	$8.50	IC	6.40	6.15
IX	11.50	10.00	IX	7.40	7.15
IXX	13.00	11.25	IXX	8.40	8.15
IXXX	14.25	12.50	IXXX	9.40	9.15
IXXXX	16.00	14.00	IXXXX	10.40	10.15

Terne Plates

8-lb. coating 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	33½c.
Bar	40c. to 44c.

Copper

Lake ingot	15 c.
Electrolytic	14¾c.
Casting	14½c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	9c. open 9½c.

Lead and Solder*

American pig lead	6½c. to 6¾c.
Bar lead	7 c. to 7¼c.
Solder, ½ and ½ guaranteed	23c.
No. 1 solder	21½c.
Refined solder	18c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	6¼c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	25c. to 27c.

Old Metals

The market is strong and business is more active. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	10.75
Copper, heavy wire	10.00
Copper, light and bottoms	8.25
Brass, heavy	5.25
Brass, light	4.50
Heavy machine composition	7.75
No. 1 yellow brass turnings	5.25
No. 1 red brass or composition turnings	6.75
Lead, heavy	4.00
Lead, tea	2.75
Zinc	2.50